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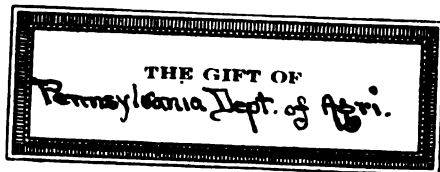
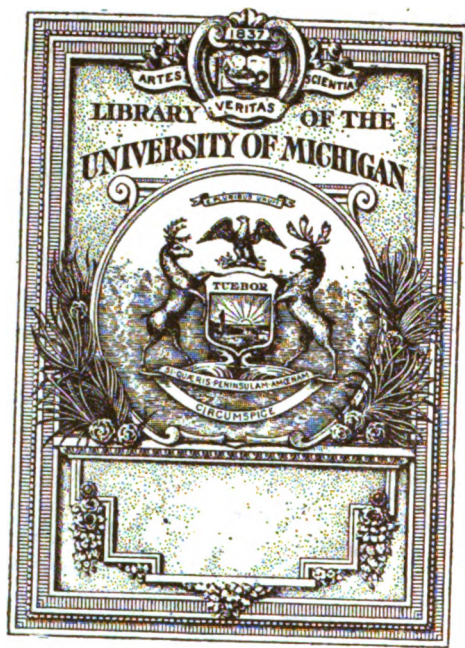
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Penn. DEPARTMENT OF AGRICULTURE

BULLETIN No. 267

PROCEEDINGS OF THE
Farmers'
Annual Normal Institute
AND SPRING MEETING
OF THE
State Board of Agriculture

COMPILED BY
A. L. MARTIN, Director of Institutes



HELD AT HOTEL CONNEAUT, EXPOSITION PARK, PA.,
MAY 25 TO 27, 1915

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1915.

Commonwealth of Pennsylvania.

Pennsylvania DEPARTMENT OF AGRICULTURE

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PREFACE

Commonwealth of Pennsylvania,
Department of Agriculture,
Harrisburg, Pa., July 15, 1915.

There is perhaps no source of information upon subjects relating to either practical or scientific agriculture that is so easily available as the Farmers' Institute, and whatever adds to the efficiency of these institutes is of paramount importance. The hope of increasing their usefulness to the farmers of the State has led to the establishment of what is known as the Farmers' Normal Institute, in which all institute managers and lecturers of the State come together once a year for consultation and instruction.

In order that the instruction given at these institutes may be available to the greatest possible number, this Department publishes, in bulletin form, their proceedings, and so we send out the following bulletin, No. 267, containing the full proceedings of the Normal Institute held at Exposition Park, Pa., May 25 to 27, 1915, in the hope that it may prove helpful upon the many farms and in the many farmhouses to which it may come.

N. B. CRITCHFIELD,
Secretary of Agriculture.



LETTER OF TRANSMITTAL.

Commonwealth of Pennsylvania,
Department of Agriculture,
Harrisburg, Pa., July 15, 1915.

Hon. N. B. Critchfield, Secretary of Agriculture:

Dear Sir: I have the honor to present herewith, bulletin of the Twelfth Annual "Farmers Normal Institute," which was held at Exposition Park, Pa., May 25 to 27, 1915.

Very respectfully,

A. L. MARTIN,
Director of Institutes.



MEMBERS

OF THE

Pennsylvania State Board of Agriculture

FOR THE YEAR 1918

MEMBERS EX-OFFICIO

HON. MARTIN G. BRUMBAUGH, Governor.
 HON. HENRY HOUCK, Secretary of Internal Affairs.
 DR. N. C. SCHAEFFER, Superintendent of Public Instruction.
 DR. EDWIN ERLE SPARKS, President of the State College.
 HON. A. W. POWELL, Auditor General.
 HON. N. B. CRITCHFIELD, Secretary of Agriculture.

APPOINTED BY THE GOVERNOR

John H. Stephens, Esq., Johnstown, Cambria County,....Term expires 1916
 Mrs. Jean Kane Foulke, West Chester, Chester County,..Term expires 1917

APPOINTED BY THE PENNSYLVANIA STATE POULTRY SOCIETY

W. Theo. Wittman,.....Allentown,.....1917

APPOINTED BY THE PENNSYLVANIA BEE-KEEPERS' ASSOCIATION

E. A. Weimer,.....Lebanon,1918

ELECTED BY COUNTY AGRICULTURAL SOCIETIES

	Term expires.
Adams, A. I. Weidner, Arendtsville,	1918
Allegheny, C. L. Hood,..... Coraopolis, R. D.,.....	1918
Armstrong, S. S. Blyholder,..... Kelly Station,	1917
Beaver, Walter C. Dunlap,.... West Bridgewater,	1917
Bedford, Wm. F. Biddle,..... Everett,	1918
Berks, H. G. McGowan,..... Geiger's Mills,	1916
Blair, W. Frank Beck,..... Altoona,	1917
Bradford, F. D. Kerrick,..... Towanda,	1916
Bucks, B. Frank Wambold,.... Sellersville,	1917
Butler, Wm. H. Milliron,.... Euclid,	1917
Cambria, L. J. Bearer,..... Hastings,	1916
Cameron, R. P. Heilman,..... Emporium,	1916

Term expires.

Carbon,	Edward Lienhard,	Mauch Chunk,	1917
Centre,	John A. Woodward,	Howard,	1918
Chester,	M. E. Conard,	Westgrove,	1918
Clarion,	J. H. Wilson,	Clarion,	1916
Clearfield,	Harrison Straw,	Clearfield,	1916
Clinton,	Joel A. Herr,	Millhall,	1917
Columbia,	A. P. Young,	Millville,	1916
Crawford,	W. F. Throop,	Espyville,	1918
Cumberland,	Abram Bosler,	Carlisle,	1916
Dauphin,	E. S. Keiper,	Middletown,	1917
Delaware,	Thos. H. Wittkorn,	Media,	1917
Elk,	John M. Wittman,	St. Marys,	1916
Erie,	John J. Rouse,	Wattsburg,	1916
Fayette,	John T. Smith,	Dunbar,	1916
Forest,			
Franklin,	J. P. Young,	Marion,	1917
Fulton,	Frank Ranck,	Hancock, Md.,	1916
Greene,	C. E. Lantz,	Carmichaels,	1916
Huntingdon,	George G. Hutchison, ..	Warrior's Mark,	1918
Indiana,	S. C. George,	West Lebanon,	1916
Jefferson,	Peter B. Cowan,	Brookville,	1916
Juniata,	Matthew Rodgers,	Mexico,	1918
Lackawanna,	Horace Seamans,	Factoryville,	1916
Lancaster,	J. Aldus Herr,	Lancaster,	1917
Lawrence,	Sylvester Shaffer,	New Castle,	1916
Lebanon,	H. C. Snively,	Cleona,	1916
Lehigh,	P. S. Fenstermacher, ..	Allentown,	1918
Luzerne,	J. E. Hildebrant,	Dallas,	1918
Lycoming,	A. J. Kahler,	Hughesville,	1918
McKean,	E. A. Studholme,	Smethport,	1916
Mercer,	W. C. Black,	Mercer,	1917
Mifflin,	C. M. Smith,	Lewistown,	1916
Monroe,	F. S. Brong,	Saylorsburg,	1916
Montgomery,	John H. Schultz,	Norristown,	1917
Montour,	J. Miles Derr,	Milton,	1916
Northampton,	C. S. Messinger,	Tatamy,	1918
Northumberland,	I. A. Eschbach,	Milton, R. D.,	1916
Perry,	Clark M. Bower,	Blain,	1916
Philadelphia,	David Rust,	Philadelphia,	1916
Pike,	B. F. Killam,	Paupack,	1918
Potter,			
Schuylkill,	John Shoener,	New Ringgold,	1916
Snyder,			
Somerset,	Robert W. Lohr,	Boswell,	1917
Sullivan,	G. Eugene Bown,	Forksville,	1918
Susquehanna,	Frank A. Davies,	Montrose,	1916
Tioga,	C. H. DeWitt,	Mansfield,	1917
Union,	J. Newton Glover,	Vicksburg,	1917
Venango,	Wm. A. Crawford,	Cooperstown,	1916
Warren,	R. J. Weld,	Sugargrove,	1917
Washington,	Jas. M. Paxton,	Houston,	1917
Wayne,	W. E. Perham,	Varden,	1917
Westmoreland,	W. F. Holtzer,	Greensburg,	1916
Wyoming,	G. A. Benson,	Tunkhannock,	1916
York,	Geo. F. Barnes,	Rossville,	1917

OFFICERS

PRESIDENT

Hon. Martin G. Brumbaugh,..... Harrisburg.

VICE-PRESIDENTS

F. D. Kerrick,..... Towanda.

J. P. Young,..... Marlon.

C. H. DeWitt,..... Mansfield.

EXECUTIVE COMMITTEE

S. S. Blyholder,..... Kelly Station.

P. S. Fenstermacher,..... Allentown.

W. C. Black,..... Mercer.

A. J. Kahler,..... Hughesville.

G. F. Barnes,..... Rossville.

Hon. H. G. McGowan,..... Geiger's Mills.

C. M. Bower,..... Blain.

Matthew Rodgers,..... Mexico.

John Shoener,..... New Ringgold.

Hon. N. B. Critchfield, Secretary of Agriculture, Ex-Officio, Harrisburg.

ADVISORY COMMITTEE, CONSULTING SPECIALISTS AND STANDING COMMITTEES AS REPORTED BY THE EXECUTIVE COMMITTEE

ADVISORY COMMITTEE

J. H. Schultz,..... Norristown.

Joel A. Herr,..... Millhall.

W. C. Black,..... Mercer.

LEGISLATIVE COMMITTEE

Hon. H. G. McGowan,..... Geiger's Mills.

Hon. Robert W. Lohr,..... Boswell.

S. S. Blyholder,..... Kelly Station.

P. S. Fenstermacher,..... Allentown.

Matthew Rodgers,..... Mexico.

COMMITTEE ON RESOLUTIONS

J. Aldus Herr,..... Lancaster.

Col. John A. Woodward,..... Howard.

B. F. Killam,..... Paupack.

George G. Hutchison,..... Warrior's Mark.

W. C. Black,..... Mercer.

MEMORIAL COMMITTEE.

Matthew Rodgers,..... Mexico.

S. S. Blyholder,..... Kelly Station.

Joel A. Herr,..... Millhall.

CONSULTING SPECIALISTS

Botanist,..... Prof. F. D. Kern,..... State College.

Pomologist,..... Chester J. Tyson,..... Floradale.

Chemist,..... Dr. William Frear,..... State College.

Vet. Surgeon,..... Dr. C. J. Marshall,..... Harrisburg.

Sanitarian,..... Dr. S. G. Dixon,..... Harrisburg.

Microscopist and Hygienist,..... Prof. J. W. Kellogg,..... Harrisburg.

Entomologist,..... Prof. H. A. Surface,..... Harrisburg.

Ornithologist,..... Dr. Joseph Kalbfus,..... Harrisburg.

Meteorologist,..... Prof. W. G. Owens,..... Lewisburg.

Apiarist,..... H. C. Klinger,..... Liverpool.

Economic Geologist,..... Prof. Baird Halberstadt,..... Pottsville.

Agricultural Geologist,..... W. H. Stout,..... Pinegrove.

Forests and Forestry,..... Irvin C. Williams,..... Harrisburg.

Feeding Stuffs,..... G. G. Hutchison,..... Warrior's Mark.

Soils and Crops,..... Prof. Franklin Menges,..... York.

STANDING COMMITTEES

CEREALS AND CEREAL CROPS

Edward Leinhard, Mauch Chunk.

ROADS AND ROAD LAWS

Col. J. A. Woodward, Howard.

FRUIT AND FRUIT CULTURE

E. A. Studholme, Smethport.

DAIRY AND DAIRY PRODUCTS

B. Frank Wambold, Sellersville.

FERTILIZERS

F. S. Brong, Saylorsburg.

WOOL AND TEXTILE FIBERS

S. C. George, West Lebanon.

LIVESTOCK

W. F. Throop, Espyville.

POULTRY

W. Theo. Wittman, Allentown

PROCEEDINGS OF THE SPRING MEETING OF THE PENN-
SYLVANIA STATE BOARD OF AGRICULTURE, HELD
AT HOTEL CONNEAUT, EXPOSITION PARK,
PA., MAY 25, 1915.

Hotel Conneaut, Exposition Park, Pa., May 25, 9:30 A. M.

Vice President Kerrick in the Chair.

The CHAIRMAN: Ladies and Gentlemen: I am delighted to preside at this meeting. It gives me a great deal of pleasure this morning to meet so many of my friends from different parts of the State, and I assure you that it is with pleasure that I greet you. The first order of business is the roll-call.

The Secretary called the roll, and at this and subsequent roll calls, the following members responded to their names:

Hon. N. B. Critchfield (Secretary and Ex-Officio member); W. Theo. Wittman (Appointed by the Pennsylvania Branch of The American Poultry Association); S. S. Blyholder, Wm. F. Biddle, H. G. McGowan, F. D. Kerrick, L. J. Bearer, Edward Lienhard, M. E. Conard, J. H. Wilson, Joel A. Herr, A. P. Young, Abram Bosler, Matthew Rodgers, Horace Seamans, Sylvester Shaffer, J. E. Hildebrant, E. A. Studholme, W. C. Black, F. S. Brong, C. S. Messinger, I. A. Eschbach, John Schoener, C. H. DeWitt, Wm. A. Crawford, R. J. Weld, W. F. Holtzer, G. A. Benson, Geo. F. Barnes and J. Aldus Herr

The SECRETARY: Mr Chairman, there is a quorum present.

A Member: I am inclined to think that some members are up at the Hall, because there are a number here that are not present at this meeting and I presume they are waiting up there.

The CHAIRMAN: There is a quorum present here. The next order of business is the reading of the minutes.

Secretary Critchfield then read the minutes of the January meeting.

The SECRETARY: It may be a matter of interest to the Board to know that the decision of the Auditor General was against the payment of the expenses of Mr. Marshall. He stated that under the law, it would be impossible to pay his expenses.

The CHAIRMAN: Gentlemen you have heard the minutes as read. If there is no objection, they will be approved.

A Member: I move that they be approved.

The CHAIRMAN: There being no objection, they are approved. The next order of business is the appointment of the Committee on Credentials. I will appoint on that Committee, E. A. Studholme, of McKean, W. A. Crawford, of Venango, and George F. Barnes of York. The Committee will please confer together and make their report.

The SECRETARY: Mr. Studholme, here are the credentials of one member-elect. If there are any other members present having credentials, they can pass them to the committee.

The CHAIRMAN: Next on the program is Reception of Credentials of new members and delegates—I guess there are none. The next order will be Unfinished Business.

The SECRETARY: Mr. Chairman, as you will have observed from the reading of the minutes, there is no unfinished business, except that there is a Committee to report. You notice, no doubt, that one of the Committees, the Committee that was appointed to consider the resolution offered by Mr. Killam in relation to the monies to be received resulting from the passage of what is known as the Smith-Lever Bill, that was referred to the Committee on Legislation; there was also referred to the Committee on Legislation, the recommendations made in certain of the reports of Standing Committees. That would make it necessary for the Committee on Legislation to make a report at this time, or the report can be held over for the annual meeting if it is thought best.

MR. MCGOWAN: The Committee on Legislation has not conferred together at this meeting; we are not ready to make a report; we can report later, if desired.

The SECRETARY: This is the only session we will have; unless there is a request for a report at this meeting. Perhaps it might be left as the understanding that you will report at the annual meeting. It will be a matter of interest to the Board, however, to know that you did discharge the duties imposed upon you, you might, in a few words, state what was done.

MR. MCGOWAN: Well, the Committee on Legislation assembled at the Bolton House and there was a full representation of the Committee and we went over all matters that were referred to this Committee especially in detail. We took up the Agricultural Commission Bill, and with some amendments, presented that, in a body, before Governor Brumbaugh. We did not feel it advisable to antagonize the measure. We inserted a clause calling for five farmers to have representation upon this Commission, and a few other

amendments we made in meeting together with Brother Creasy and Mr. MacFarland and a few others. We went over the Fertilizer Bill and the weight of apples, weight of various farm products, and other matters that were referred to us. We discharged our duties, as we thought, to the best of our ability, and we will make a subsequent report and a full report at the annual meeting.

The CHAIRMAN: Very well, Mr. McGowan.

MR. DEWITT: As Chairman of the Committee, known as the Roads Committee, I will say that they seem to have finished their work and I move you that the Committee be discharged.

Motion seconded and adopted.

The SECRETARY: That was the Committee that was appointed prior to the last annual meeting?

MR. DE WITT: Yes.

The SECRETARY: I would like to add to the motion, that it be discharged with the thanks of the Board, because that Committee had some very strenuous work to perform, and I think we are under an obligation of gratitude to the Committee. Of course, Mr. Killam, being a member of the Committee, will not be expected to accept that amendment, but let it be understood that the Board gives a vote of thanks to the Committee and let the question be on the adoption of Mr. Killam's motion that the Committee be discharged.

Motion adopted.

The SECRETARY: Now, Mr. Chairman, in view of the fact that this Committee has had a good deal of arduous work to perform and did it faithfully and very satisfactorily, I move that a vote of thanks be extended to this Committee.

Motion seconded and adopted.

DR. CONARD: I notice, in the reading of the minutes, that one of the members of the Executive Committee, Mr. Naginey, is not with us, having passed away, and wouldn't it be well to appoint someone in his place at this time?

The CHAIRMAN: I think it is a very proper thing to do.

DR. CONARD: Mr. Naginey was also a member of the Resolutions Committee, I think.

MR. KILLAM: I move you, Mr. Chairman, that the Chair appoint to fill the vacancy caused by the death of Mr. Naginey, on the Executive Committee and on the Resolutions Committee.

Motion seconded.

The CHAIRMAN: It is moved and seconded that the Chair appoint a member to fill the place of Mr. Naginey on the two Committees.

Motion adopted.

MR. STUDHOLME: The Committee on Credentials is ready to make a report.

The CHAIRMAN: I will appoint in place of Mr. Naginey, Mr. Black, of Mercer county, on the Executive Committee and also on the Resolutions Committee. Now Mr. Studholme, we will hear your report.

Mr. Studholme then submitted the following report of the Committee on Credentials recommending the election of Mr. Smith as a member of the Board from Mifflin county.

MR. JOEL A. HERR: His term will expire then with Mr. Naginey's?

The SECRETARY: It is understood, Mr. Studholme, that your report intended to place this gentleman, Mr. Smith, in place of Mr. Naginey and that his term shall expire when Mr. Naginey's term would have expired?

MR. STUDHOLME: Yes sir.

MR. JOEL A. HERR: Will you tell us when that was? I think that was omitted on the program.

The SECRETARY: I cannot tell you why that omission was made.

A Member: Will you find when his term expires on the program of last winter's meeting?

The SECRETARY: The records are in the office but I haven't the information just now.

MR. JOEL A. HERR: I would just like to make a little statement here: I have taken the pains to go over the list of members and the date of the expiration of their term of office and I find that those whose terms expire in 1916 are about 50% greater than those that expire in 1918—something near that. Now, in order to equalize that, I think that some action should be taken by the Credentials Committee, or some proper authority, to have the thing equalized, as the law creating the Board states that one-third of the number of terms must expire each year. That lets a great deal more than one-third come in in 1916 than in 1918. 1917 is between the two, and it is also between in the number of expirations, but it is nearer right than either of the others.

MR. BARNES: I think there is a chance to figure that out this year. A few years ago a number of counties had failed for several years to elect a member of the State Board and I think it was requested at one of these meetings that the Secretary urge the election of a member, which resulted in more counties electing members that year, which would bring about this surplus membership. I think the Secretary will remember what took place at that time.

The SECRETARY: Mr. Herr has usually been on the Credentials Committee and probably will be on that Committee at the next annual meeting and that will give him a chance to carry out his suggestion. I think the change occurred just in the way Mr. Barnes has expressed it, but I could not say positively.

MR. JOEL A. HERR: If the Committee has the authority to fix the terms, suppose that someone—we will say Potter county which is not represented on the Board now, should send in a man for three years from the date of his election, that might happen just to occur in the year 1916 or 1918, and I do not know whether the Committee would have power to correct that, but if there should be an understanding from headquarters I think these organizations would come in with that understanding as to when their terms should expire.

The SECRETARY: You can count the regular terms from the time when they had the last member of the Board.

MR. JOEL A. HERR: The dates were all right once but the membership has increased and the dates have been changed since its organization.

MR. KILLAM: It seems to me that that matter can be only corrected by the Legislature. When a man is elected by an agricultural organization, it states that his term exists for three years from his election, whatever the date may be. Do I understand, Mr. Herr, that the Committee could fix the term? The intention of this Committee was to confirm the appointment for the unexpired term of Mr. Naginey, whatever it might be and the law fixes the term of service as I understand it, for the term of three years. A man's term expires three years after he has qualified.

MR. JOEL A. HERR: The law also says that the Board shall be divided into three parts; that one-third of the members shall go out each year; there is a contradiction there.

The SECRETARY: Well those things do sometimes occur and it is pretty hard to get over; when they go out and stay out, that makes trouble.

MR. JOEL A. HERR: I think it can be done through the Secretary.

MR. MATTHEW RODGERS: I think it is immaterial. We have the full number; but death, removal and failure to elect members has caused this change. While it does not make any difference in our business, we would like to have representatives from every

county. But the dropping out and changing has caused this irregularity in the business and I would move that the Secretary be requested to look this matter up, and when members are elected from counties not now represented, make a suggestion to them that they elect their members for such a length of time, which will readjust the condition of things at the present time.

Motion seconded and adopted.

MR. S. S. BLYHOLDER: My county would then elect me for two years; would that be a legal election when the law says he shall be elected for three years?

The **SECRETARY:** The motion is to suggest to the Secretary that he shall fix this up; and he will certainly fix it up according to the law.

MR. MATTHEW RODGERS: That was my idea.

The **SECRETARY:** I haven't any idea but that the Secretary, whoever he may be, before he tackles the legal question will see the Attorney General.

MR. MATTHEW RODGERS: Of course it is known to the members of the Board now that Mr. Naginey is dead; but I wish to notify you officially—I was at the funeral and saw him buried—I had the honor of being one of the pallbearers, and it was a very sad funeral, very largely attended. While it was a pretty cold day, his neighbors and friends and the citizens all turned out and spoke to each other with great respect for the gentleman who died, and I think it would be advisable for us to have a Committee appointed to pass some short resolutions representing the feelings of this Board in regard to the loss of him who was such a useful member and a good man in his home community and every place he went, at this meeting. And while I am speaking I would just like to say that you will find this man Smith a very fine man; he is one of the most aggressive truckmen that we have in all of our country there. He was a railroader and left the railroad and bought a small farm of ten acres and has improved it and brought it to such a high state of perfection that he gives work to his family, all of whom are large, and has to hire more help. He is a success.

The **CHAIRMAN:** Do you put that in the motion?

MR. MATTHEW RODGERS: No, I just move you that a Committee be appointed to draft resolutions in regard to the death of Mr. Naginey.

The **SECRETARY:** Before the vote is taken on that motion, I want to say that Mr. Rodgers attended that funeral—no doubt he intended to attend it anyhow—but he attended that funeral as a representative of the Board. I think that when the time came I found it impossible for some reason to attend myself and knowing that Mr. Rodgers was not very far away, I wrote and asked him to go as a member of the Board. Is that correct?

MR. MATTHEW RODGERS: That is correct.

The **SECRETARY:** So that Mr. Rodgers was there as your representative, and I think it is fitting and proper that we should appoint a Committee at this time. I do not want to forestall anything that the Chairman may have in his mind, but I would like to see Mr. Rodgers Chairman of that Committee.

The **CHAIRMAN:** That is satisfactory to me.

MR. MATTHEW RODGERS: In regard to what the Secretary has said, I would say that I did comply with the request of the Secretary and I did go and see the family and present the good will and feelings of this Board in regard to the death of the husband of Mrs. Naginey, and met her children and other relatives and friends and we had a consultation separately.

MR. JOEL A. HERR: When the motion is put I would like to state that it has been customary and I think it is prudent that such memorials should be presented at the annual meeting. This is the only meeting we will have to-day; the Committee will not have time to prepare memorials to be presented to this meeting and adopted. Therefore, I move that the subject of memorials be referred to the annual meeting.

Motion seconded.

The **CHAIRMAN:** This Committee can be appointed and make the report at our annual meeting, Mr. Herr.

MR. JOEL A. HERR: Mr. Chairman, I want to state that a short time ago we lost our Ex-Secretary, Thomas Edge, and I think a suitable memorial ought to be prepared for him and I think the same Committee that does one ought to do the other. There may some of the rest of us pass away before next meeting and there will be a Memorial Committee appointed at that time. I have no objection to Mr. Rodgers being on the Committee or Chairman of it, and in the meantime, he might be prepared to report, but I only want to say that there will be a Memorial Committee appointed and there will be other memorials besides Mr. Naginey's, therefore, I think it is more fitting that it be made at the annual meeting.

Motion carried.

MR. B. F. KILLAM: I believe that we have the other motion, that the Committee be instructed to report at our next annual meeting.

The **CHAIRMAN:** That motion was made.

Motion seconded and adopted.

The **CHAIRMAN:** Mr. Rodgers will be Chairman of the Committee; Mr. Blyholder and Mr. Joel A. Herr will also be members. Gentlemen, is there any other business?

The SECRETARY: I move that we adjourn; but before adjournment, I want to say that the Governor of the Commonwealth, who is President of the Board, sent his greetings to this meeting and asked me to say to the members of the Board that he was very sorry that he would be unable to attend; that he had the meeting in mind and was trying to make arrangements to get here, but being so pressed during the last days of the session of the Legislature it was impossible for him to get off on account of certain other work that had to be done, and then he called my attention to the fact that he had only 30 days to consider all the bills left on his hands and make the adjustment of the appropriations so they would fit in with the revenues of the State. He wanted to be remembered to the Board, stating that he appreciated the Board's work, and that while you were working here for the advancement of the interests of agriculture, he was at the other end working along the same lines. I had nearly forgotten to deliver this message, but I am glad that it came to my mind before our adjournment.

There is one other announcement I want to make. I received, since I came here, a letter from our good Brother Schultz, the Pennsylvania Dutchman, from Montgomery county, and he expressed sincere and heartfelt regret that he cannot be here and enjoy the good things of this occasion, the meeting with the brotherhood, and he made the statement that the reason why he could not be here was on account of his wife having undergone a very painful and dangerous operation at the German Hospital and he feels, and feels rightly, I know we will all be ready to say, that his place is right there with her at the present time, so he cannot be with us.

DIRECTOR MARTIN: I am informed that the auditorium is now placed in order for our meeting at half past one o'clock this afternoon.

The CHAIRMAN: All understand we will meet at the auditorium at 1.30.

The SECRETARY: I move to adjourn to meet at the auditorium at 1.30.

Motion seconded and adopted.

N. B. CRITCHFIELD,
Secretary.

LIST OF COUNTY INSTITUTE MANAGERS FOR THE SEASON OF 1915-16.

County.	Name and Address of Chairmen.
Adams,	A. I. Weldner, Arendtsville.
Allegheny,	C. L. Hood, Coraopolis, R. D. No. 3.
Armstrong,	S. S. Blyholder, Kelly Station.
Beaver,	Walter C. Dunlap, West Bridgewater.
Bedford,	W. F. Biddle, Everett, R. D. No. 2.
Berks,	H. G. McGowan, Gelger's Mills.
Blair,	W. Frank Beck, Altoona.
Bradford,	F. D. Kerrick, Towanda, R. D. No. 9.
Bucks,	B. F. Wambold, Sellersville.
Butler,	W. H. Milliron, Euclid.
Cambria,	L. H. Bearer, Hastings, R. D.
Cameron,	R. P. Heilman, Emporium.
Carbon,	Edward Lienhard, Mauch Chunk, R. D. No. 1.
Center,	John A. Woodward, Howard.
Chester,	M. E. Conard, Westgrove.
Clarion,	J. H. Wilson, Clarion.
Clearfield,	Harrison Straw, Clearfield.
Clinton,	Joel A. Herr, Millhall.
Columbia,	A. P. Young, Millville.
Crawford,	W. F. Throop, Espyville.
Cumberland,	T. J. Ferguson, Mechanicsburg.
Dauphin,	E. S. Keiper, Middletown.
Delaware,	Thos. H. Wittkorn, Media.
Elk,	John G. Schmidt, St. Marys.
Erie,	Archie Billings, Edinboro.
Fayette,	John T. Smith, Dunbar, R. D. No. 32.
Forest,	C. A. Randall, Tionesta.
Franklin,	J. P. Young, Marion.
Fulton,	Frank Ranck, Hancock, Md.
Greene,	J. W. Stewart, Jefferson.
Huntingdon,	G. G. Hutchison, Warrior's Mark.
Indiana,	S. C. George, West Lebanon.
Jefferson,	Peter B. Cowan, Brookville.
Juniata,	Matthew Rodgers, Mexico.
Lackawanna,	Horace Seamans, Factoryville.
Lancaster,	J. W. Bruckart, Lititz.
Lawrence,	Sylvester Shaffer, New Castle.
Lebanon,	Edward Shuey, Lickdale.
Lehigh,	P. S. Fenstermacher, Allentown.
Luzerne,	J. E. Hildebrant, Dallas.
Lycoming,	A. J. Kahler, Hughesville.
McKean,	E. A. Studholme, Smethport.
Mercer,	Wm. C. Black, Mercer.
Mifflin,	C. M. Smith, Lewistown.
Monroe,	F. S. Brong, Saylorsburg.
Montgomery,	J. H. Schultz, Norristown.

County.	Name and Address of Chairmen.
Montour,	J. Miles Derr, Milton, R. D. No. 1.
Northampton,	C. S. Messinger, Tatamy, R. D. No. 1.
Northumberland,	I. A. Eschbach, Milton, R. D. No. 1.
Philadelphia,	David Rust, Horticultural Hall, Philadelphia.
Perry,	C. M. Bower, Blain.
Pike,	B. F. Killam, Paupack.
Potter,	A. T. Crittenden, Oswayo.
Schuylkill,	John Shoener, New Ringgold.
Snyder,	F. F. Glass, Freeburg.
Somerset,	Robert W. Lohr, Boswell.
Sullivan,	E. R. Warburton, Campbellville.
Susquehanna,	F. A. Davies, Montrose.
Tioga,	C. H. De Witt, Mansfield.
Union,	J. Newton Glover, Vicksburg.
Venango,	W. A. Crawford, Cooperstown.
Warren,	G. A. Woodside, Sugargrove.
Washington,	Jas. M. Paxton, Houston.
Wayne,	W. E. Perham, Varden.
Westmoreland,	W. F. Holtzer, Greensburg.
Wyoming,	G. A. Benson, Tunkhannock.
York,	G. F. Barnes, Rossville.

LIST OF INSTITUTE LECTURERS FOR SEASON OF 1914-15.

Anderson, H. M., New Park, Pa.
Barnitz, C. M., Riverside, Pa.
Bond, M. S., Danville, Pa.
Campbell, J. T., Hartstown, Pa.
Card, Fred W., Sylvania, Pa.
Conard, Dr. M. E., Westgrove, Pa.
Cooke, Prof. Wells W., U. S. Department of Agriculture, Washington, D. C.
Darst, W. H., State College, Pa.
Dorsett, E. B., Mansfield, Pa.
Fassett, F. H., Meshoppen, Pa.
Faust, S. L., Hoboken, Pa.
Funk, Sheldon W., Boyertown, Pa.
Gooderham, H. M., Patton, Pa.
Groupe, J. Stewart, Jersey Shore, Pa., R. D. No. 4.
Herman, J. A., Fombell, Pa.
Herr, John D., Lancaster, Pa.
Horrocks, Wm., Souderton, Pa., R. D. No. 1.
Hulsart, C. C., Matawan, N. J.
Kline, Frank, Spring City, Pa.
Lighty, L. W., East Berlin, Pa., R. D.
Lyons, Dr. Hannah McK., Lincoln University, Pa.
Mairs, Prof. T. I., State College, Pa.
McCallum, M. H., Wernersville, Pa.
Menges, Prof. Franklin, York, Pa.
Mitman, Howard, Hellertown, Pa.
Noll, C. F., State College, Pa.
Orton, C. R., State College, Pa.
Patton, W. M., Mosgrove, Pa., R. D. No. 2.
Phillips, E. L., New Bethlehem, Pa.
Phillipy, Dr. W. T., Carlisle, Pa.
Putney, Fred S., State College, Pa.
Rabild, Prof. Helmer T., U. S. Department of Agriculture, Washinton, D. C.
Row, Chas. A., Yardley, Pa.
Seeds, Robt. S., Birmingham, Pa.
Smith, R. S., State College, Pa.
Stout, W. H., Pinegrove, Pa.
Struble, Vern T., Athens, Pa., R. D. No. 24.
Tomhave, W. H., State College, Pa.
Van Noy, Leon Otice, Troy, Pa., R. D. No. 66.
Watts, D. H., Kerrmoor, Pa.
White, John W., State College, Pa.
White, W. R., State College, Pa.
Wittman, W. Theo., Allentown, Pa.
Worthen, E. L., State College, Pa.
Wrigley, Paul I., Eddington, Pa.

PROCEEDINGS OF THE FARMERS' ANNUAL NORMAL INSTITUTE,
HELD AT EXPOSITION PARK, (CONNEAUT LAKE)
PA., MAY 25-27, 1915.

Exposition Park, May 25, 1915, 1.30 P. M.

Director Martin in the Chair:—

The CHAIRMAN: Friends, the time has arrived for opening the exercises of our Annual Normal Institute. The presiding officer will be Mr. W. F. Throop, the County Chairman of this county.

Mr. Throop takes the Chair.

The CHAIRMAN: Ladies and Gentlemen: It is a pleasure to me this afternoon to meet such a body of people as we have here, though I would be far better satisfied in my own mind if some of the older members of the Board had taken the Chair. But with your help we will try and make the meeting a success, as we hope it will be. First, we have this afternoon the Address of Welcome, and it is with pleasure that I introduce to you Mr. James E. Reany, President of the Chamber of Commerce of Exposition Park.

MR. JAMES E. REANY: As President of the Board and on their behalf, I wish to extend to each and every one of you a most cordial welcome. We feel especially proud to have you among us and trust that your stay will be one to be remembered. We especially appeal to those members who have come from some remote part of the State, because we are very proud of this particular section and of our beautiful little body of water here, which we feel is unsurpassed in natural beauty anywhere in the country; and those who come from the eastern part of the State, where water is rather a scarce article, we want you to carry back with you a lasting remembrance of this place.

I feel that there is a wonderful opportunity now for the farmer. It seems to me that the United States very soon will become the granary of the world. An agricultural buying movement no doubt will soon be inaugurated that will be stupendous in character, and it behooves every man of agricultural inclination, to set himself about the task of "setting his house in order," in order to provide himself with all the knowledge and apparatus necessary to promote the agricultural interest of this vast country. Europe, being devastated by war as it is to-day, is reduced to a very unproductive state, agriculturally, and I believe that this country is destined to supply the sustenance of the world in no mean degree, and it gives me personally a great deal of pleasure to commend to every man the excellent work that these institutes and the Board of Agriculture are able to perform.

It is absolutely necessary that everyone pay some attention, some heed to agricultural pursuits. The day has passed when things are being done as our grandfathers did them. The schoolmaster has been abroad in this country and it is essential that we all appreciate that fact. We all realize that we have a great many men in our several Bureaus of Agriculture devoting their time and their energy to the advancement of this fundamental industry, the primary work of any country, and I trust that this meeting will be productive of an immense amount of good; that you will all carry back with you something to be remembered, some information of a useful character, something you can apply to your everyday needs, and that you will carry with you also a remembrance of our beautiful little resort. I bespeak for every man, on his part, his hearty co-operation and good will in the furtherance of this convention.

The CHAIRMAN: We have another gentleman from Crawford county who has been a tireless worker in the interests of agriculture, and I assure you it is a great pleasure to introduce the Hon. R. C. McMaster, of Adamsville.

MR. McMASTER: Mr. Chairman, Ladies and Gentlemen of the Farmers' Normal Institute: I am glad to have the pleasure of saying a very few words of welcome to you to-day. Being introduced to an audience always reminds me of an old story that I heard related of Josh Billings. Josh Billings was a humorous lecturer of some years ago and he was engaged by a club down at Plainfield, N. J., to deliver a lecture, and the club had selected a young man of great ambitions to introduce Josh to the audience. When the time came for the introduction, the young man appeared all toggled up in great shape and seemed to think a great deal more about himself than he did about Josh, and he commenced in this way, becoming somewhat confused as to what he was there for, said: "I am not Josh Billings, nor his wife, nor his son, nor his daughter, nor his man servant, nor his maid servant, nor his ox"—and there he stopped and left old Josh to wade out.

My friends, it is my pleasure indeed to welcome you to old Crawford county. We feel proud of old Crawford county. It is written of the county that it has been the best dairy county in the State of Pennsylvania. We welcome you here. We welcome you to Conneaut Lake, the most beautiful and the largest lake in the State of Pennsylvania. We welcome you here for what you represent, the whole State of Pennsylvania, which is a good deal. We welcome you for the purpose that you come here. You come here for the exchange of thought which elevates mankind. You come here, as I understand, for the diffusion of knowledge along the line of farming, which has done so much in the past for the farming interests and will continue to do more in the future.

The farming interest is the greatest industry in the world; it has been so since Adam hid behind the apple tree, and will continue to be so. It is the industry upon which all other industries, great industries, are founded. It is the foundation of all other industries, and it is the industry that feeds the world and will continue to feed the world, and we trust that your meeting here will be profitable along this line, the exchange of thought which helps along,

which has done so much in the past. As one item occurs to me recently, I can remember in these beautiful valleys and hills of ours here at this time of the year when your meadows were red with soil, ruined with soil, that would not produce one quarter of a crop and farmers that I talked with did not know what to do and had no remedy to overcome it at that time, but now, through influences just like you exercise, the distribution of knowledge, the diffusion of knowledge, that has all been overcome to a great extent and these same meadows now are producing bountiful crops. This is only one result of one item of your line and there are many and we are pleased to have you work along this line. We hope that your meeting here will be pleasant and will be profitable to all, and we welcome you to Conneaut Lake and Exposition Park, to our magnificent hotels, and trust that you will go away pleased that you came.

The CHAIRMAN: We have another member with us here from Crawford county whom I believe it would be an injustice not to call upon for a few words, our brother granger and institute worker, Brother J. T. Campbell.

MR. CAMPBELL: Yes, I did want to say a word of welcome to you people and my friends, I am sure, and I have no speech—I did think a while ago I might get up a little speech for this occasion but I thought I might spill over, so I haven't any speech at all. I did make out a few notes as I was sitting here listening to the others on this welcome.

In the first place I want to say that I welcome you here, first and foremost, for the manhood and womanhood that your represent. I have reason to believe, I believe I can safely say that I have a personal acquaintance with every one of you, and I know whereof I speak in that respect and because of the sterling qualities of manhood and womanhood that your represent, I welcome you to Crawford county as a farmer; we need you, we need men like you, we need your influence here as well as the things that you have that contribute to better farming because it is not all of the subject of farms to go out and be a better farmer and till the land a little better than it has been tilled before; far from it, and we know that the great work of the Farmers' Institutes in Pennsylvania has not stopped there. And let me say to-day, while we are in a section of Pennsylvania that is more newly settled, not quite as old a country as the part of the State on the other side of the mountains from which many of you come, I want to assure you that the Indians at the present time in this section are all peaceable, as far as that goes, you need have no alarm in that direction.

I do want to say that we have a good country here, not as well developed as it might well be in the future, without any doubt. I have traveled about a little, studying agricultural conditions and have been in almost every county of the State and in almost every county of two or three other states and I can safely say that I think we have a land here with great possibilities, much of which has not been fully developed. Not a great while ago I spent a week in northern Illinois and visited many farms, and the farmers told me their land there would bring \$200 to \$300 an acre readily. Our land is not bringing these prices; we have fairly good land, not so well improved perhaps, but it can be bought at \$50 to \$60

an acre and you can spend \$50 an acre more on it in the way of drainage and improvements and have land at a cost of \$100 an acre that I feel perfectly safe in saying will yield more net profit to the acre after the expenses are taken out than the \$300 an acre land in northern Illinois will yield, as far as agriculture goes. So we need men to develop these possibilities to a greater extent than they have been developed in the last few years.

We welcome you because you have brought better agriculture and better home conditions, the things that really amount to so much. You are in a land to-day where a large percentage of the farmers own their homes and have them paid for. You do not find the fat of the land oozing out as readily as in Lancaster county, but they get the results nevertheless. You can go into many many homes in western Crawford county to-day, though they are not pretentious, though they are not mansions or palaces, and you will find all the modern conveniences in the way of modern heating appliances, good lighting systems, bath room equipments and all those things. We do not need to be told that there are a whole lot of us who need these things, we realize that and we know the blessings that go with them. What we need is some help to tell us how to acquire some of these things; that is the problem we are up against to-day. It is illustrated by the fact that when milk in this county brought a little less than three cents a quart, good Jersey milk, that not far away is bringing eight and ten cents from the consumers—we need some of that profit and we will have more when we get our share. One of the great things we are up against in western Crawford county, is the question of who is going to help the farmer win his battle. That is the question that is coming up for solution. We believe to-day that the organization that you represent is going to have a part in that direction, must have a part in that direction. We welcome you here then because we believe you are able to help us in that direction and we look to you for some help along these lines.

Then, further, I want to say, personally, that I welcome you here because of what you have been to me as brothers and sisters in this work. I do not have to go back very many years in my life till I recall the time when I started out to try to do a little Farmers' Institute lecture work and my first attempt fell rather flat and I realized that I was a failure along that line and wanted to give it up and friends like Brother Lighty and Brother Seeds took me and stood my feet on a rock along these lines and I shall always feel under an everlasting debt of gratitude for their help and strength in that direction and the help that comes from all of you in this great association work. And again I should have been very much pleased if it had been possible, by some arrangement, that I could have had you all over to Woodbine Farm for a short time at least, but it did not seem possible to make an arrangement of this kind, but I hope that many of you as possibly can will find it convenient to make a short visit at least before your return to your homes and we shall be glad to see any and all of you who can come. We are not doing great things over there, not running a show place or anything of that kind, but we have accomplished some results by patient effort and hard work along the lines we have been working in the past few years and we feel that our work is only well begun.

It is sometimes said that a Farmers' Institute lecturer ought to be a good farmer, and so he should; but a man ought also to be a good farmer because he is a lecturer. It is a rule that works both ways and I feel when I go out into the work of the Farmers' Institutes I endeavor to put into my work the very best that I can. I feel that my efforts are feeble along that line many times, but I oft-times feel that if I were able to give to the State of Pennsylvania and its agriculture and those with whom I come in contact, as much as I have received in the work, then I should feel that I have accomplished a great measure of success; but I am sure I will never be able to give out as much as I have received. in this work. If you will come over, any and all who can, you will find a hearty welcome when you come to Woodbine Farm and we are trying to put into practice there the results of what we have found out in our work on the farm.

Let me say in closing. In my contact with institute work in the State of Pennsylvania, in my contact with institute workers in quite a number of other states, I can safely say that I think in broad-minded spirit and in ability to look at the great questions of agriculture from every side, that I know of no body of men and women in this country to-day that take the broad-minded and all-sided view of the great agricultural questions that is taken by the great agricultural institute workers of the United States in general, and I know that that especially holds good in the State of Pennsylvania. I am not going to find fault with the specialist or anything of that kind. The specialist is a useful man and has accomplished a great work in Pennsylvania and in this country to-day but you know and I know that many times the man that specializes intensely, where he may know a whole about his particular special line, it is not always possible for him to see the relationship of his special problem to the other problems in general and because of his inability to see his proper relationship in this light, he does not grasp the full situation sometimes that is grasped by the man who does not devote himself so closely along one special line.

Now a word as to the future work of the institute. I hope that this meeting here—I know this work will be constructive because we have great opportunities and great possibilities along this line and great problems yet to be worked out and great work to be done by the Farmers' Institute workers of the State of Pennsylvania. I am aware in some states that there are those to-day who would undertake to say that the Farmers' Institute movement of our country has accomplished its work and should be abandoned. A few months ago I heard a man undertake to hold the funeral obsequies of the Farmers' Institute work of the United States, and right then and there I was reminded of that old saying of Gordon Graham, that the first requisite of a quiet funeral was to have a willing corpse, and you know as well as I that the corpse in Pennsylvania is not by any means willing. We welcome you because of the work yet to be done by the Farmers' Institute of Pennsylvania. I want to welcome you, County Chairmen, because of the many kindnesses and courtesies you have extended to me as I have been with you in the various counties, and perhaps there is not another State in the Union to-day that has a similar body of men, willing to serve without pay, giving one to four weeks of their time

to the advancement of the agriculture of our great Commonwealth without any pay whatever, in order that this work may go on. It certainly speaks well for the Commonwealth of Pennsylvania, it speaks well for the future of agriculture that Pennsylvania is able to have a body of men like this, and as I have mingled with you remembering the many kindnesses and courtesies that you have shown me I extend a special welcome to western Crawford county. I know there are times when this Institute work does not move along as smoothly as it might and the county chairman gets a whole lot of blame too, but it is the man that does the best that gets more kicks than all the rest and after all a man that does something is always going to get some kicks, if there is any consolation in that, you have it.

So with these remarks—and there are other things that I might have said—but do not forget that we extend to you a most hearty welcome here at this time and want to take part in this meeting and want to go out from this meeting the very best results that have ever gone out from a meeting of this kind and as far as we are able at least to contribute in that direction, we are going to do it. Many of the mistakes we make—and we will make them and always have made them and you are going to make them—they are mistakes not of the heart at least, and just consider them in that light, and so we extend to each and every one of you both lecturers and county chairmen and all of you a most hearty and most cordial welcome.

The CHAIRMAN: For response to the gentlemen who have spoken, I have the honor of presenting to you the Hon. A. L. Martin, Director of Institutes.

DIRECTOR MARTIN: Mr. Chairman and gentlemen who have so generously offered us everything that is in and around Conneaut Lake and extended us a hearty and generous welcome; I may say that in traveling over Pennsylvania for the past 16 years I have sometimes been led to think, at least, that if there was a possibility of partiality not on the part of the Lord in the blessings that he bestows upon his people, it was first that we were given a home in a state like Pennsylvania; and then again after looking more closely into the various conditions, educational, social and along broad agricultural lines, I have been led to know that in every single county of the State there seems to be some special benefit bestowed not quite common to the other counties. And now as we come into Crawford county, I have been led to believe, not only to-day but upon other occasions, that if that partiality were at all possible that Crawford county was blessed at least in some things beyond most of the counties of the State of Pennsylvania.

What are some of these things? First, Crawford county has the advantage which some other counties do not have, of access to a higher education by your educational institutions; it has access to as good, if not the best, common schools within the State, and you have a soil, or rather I should say, you have farm homes unexcelled, except by the most costly, but real farm homes unexcelled by any other county of the State. And more than that, you occupy one of Nature's beauty spots in Pennsylvania where we are holding this meeting; the largest inland water of the State is here, beautiful in

all its surroundings and a piece of water of utility as well, where we can come from all the counties and all parts of eastern Ohio and western Pennsylvania, and where the teeming multitudes in our cities seek constantly for a place of wholesome recreation. Here, at Conneaut, is one of those beauty spots that Nature has bestowed upon you for your benefit and for the benefit and uplifting of mankind.

Now, my friends, what should we say of the outlook? Agriculture—what is it? What does it represent to-day? Do you not know that it has a broader horizon, it has a brighter prospect than ever before in its history? Do you not know that every thinking man and woman to-day in this country of ours is thinking and writing and talking about the farm and farm life? What does that mean? Some of these Associations have undertaken, even though they exist in cities and towns, the task of giving us farmers an uplift. We are pleased with the thought. We are pleased with the knowledge, that at last the whole world has come to its proper senses and that it is admitted and proclaimed that the occupation that we represent here to-day is the one great occupation upon which all mankind, all trades, all industries and pursuits must look for their own upbuilding. Does that, my friends, give you any conception of the vast responsibilities that rest upon you and me and every man and every woman who cultivates a foot of God's earth?

What are some of our responsibilities? I should say that the man who is year by year cultivating that acre and not improving its productive power and force is not living up to his divine commission. The man upon one of God's acres here to-day in Pennsylvania that is not increasing its powers is in some sense robbing God's earth; and we are here to-day, my friends, to devise ways and means by which we may magnify the powers of the acre. We are here for greater things than even that. The improvement of the soil comes first of course. Then there may come another improvement; the greatest improvement that can come to the farmer life of Pennsylvania, is to improve the social, the educational, and, if you will, the spiritual life upon the farm. What are the agencies? The school. What should it be? When I say the school, I mean that school that you and I attended when we were boys and girls. I mean that country school and that country schoolhouse. Do you know that more depends this day and age and generation in which we live, upon the mental and moral equipment of that boy and girl than any other one thing that you can name? I sometimes think that we have gone to a little extreme in the direction of looking after the animals on the farm and the crops on the farm and the disposition of the same—that we went a little too far, further than we have gone in looking after the conditions of the schoolhouse and equipment of that school and the preparation of our children and their equipment to fight the great battles of life as they will be called upon to meet them.

Then there is that other thought; the social side of our lives. We farmers, amongst all the other occupations and businesses of life, live our lives in a certain measure separate, as it were, the one from the other. Oh, how important it is in all this work that we have community interests somewhere, the social center somewhere, handled

and governed and controlled by the wisest and most discreet men and women of all that community, who shall lead along and lead up the youth of that community to a desire for the highest order of social life in that community. Do you think of all these things in that way?

Then again that other part, and I ought to call it the part performed by the country church. It has been my privilege for the past 16 years to travel up and down and all over Pennsylvania—indeed I can see its beauty spots here and there all over the State—and consider these things; and Sabbath Day, as my custom is, I go into the country church where I am stopping and have observed some things; I have observed that the attendance at that little country church has been for years on the decline and is to-day less than it was a decade or two ago. What is the reason for all this? Are we not a pious people? Do we not love spiritual things? I cannot believe that we do not. But what is the reason for the decline in the attendance in that country church? I will give you a thought upon that: It is that occasionally, and I do not want to censure the ministry, far from that, my own mother taught me better than that, but one of the reasons, in my judgment, for the decline in the country church is, that a certain proportion of the ministry in these country churches have never studied the interests and principles of agriculture. Why sometimes I have heard these ministers undertake to pray as men of prayer and their prayer breathed not the spirit of the husbandman but rather an excuse for it, and if the day comes, my friends, when the country church will occupy the place the Lord intended it should occupy in agriculture, it will be when the ministry thereof have made a study of the great principles of agriculture, and they can live and act in a sphere of sympathy with the great work in which you and I are engaged, and that church will become not only a religious but a social center, together with the schools of the country, gathering in the young and the old in one grand social and religious action. Then, together with the knowledge attained through the study of the great principles of agriculture by the great organization of Farmers' Institute workers and other agencies, then may we expect, my fellow farmers, to have agriculture stand up as a beacon light to every other industry and occupation as the one occupation blessed of God and sanctioned and upheld by all other industries, and we ourselves having the highest conception of the noblest work ever entrusted to mankind.

But I want to turn again to this beautiful, splendid Crawford county. You have some things here in great abundance. You have a soil easy of cultivation, ready of response to your touch; but you need some things that you do not have, in my conception of the matter. If the farms of Crawford county were underdrained as they should be, every acre of all these farms in the county would double its production. Do you believe that? They would double their production. Hence, I am firm in stating, first, underdrainage; then careful cultivation. But I guess you are going to get more water over here pretty soon and I don't know what to say about it; but I do say that if I had the privilege of the cultivation, after it was underdrained, of Pymotuming Swamp for ten years, I was going to say I would pay the National debt. But I am going to say to you that your thousands of acres in that, embrace land than

which in the United States there is not a better prospect for growing the vegetables that the world consumes, than this old swamp, if it were underdrained; but you are going to cover it with water to help feed some splendid manufacturing plants. That looks all right. But here is the question for you to solve; if you underdrain it you will get all the water that is there, won't you, and let it run down into the Shenango and let us dam the Shenango and cultivate this splendid outlook for old Crawford county. That runs a little counter to some teachings. It is my conception of it, that is all.

Gentlemen of Crawford county, you have your own problems to solve. We are here as an organization of the Farmers' Institutes, representing a part of the State Government of Pennsylvania to help you with any of the problems you have. The sessions of this Institute will be open until Thursday night and we trust that you will bring these problems here and let them be freely discussed. This is no star chamber association, it is for open and free discussion of all the great problems that confront us in agriculture.

Now, my friends, I have talked altogether too long. I suppose I will talk a good deal more at some other sessions of this meeting; but we are indeed gratified to receive so generous a welcome from Crawford county and we are glad to meet on this beautiful location and I am sure we will all go away feeling that it was good for us to be here. I thank you.

The CHAIRMAN: I take pleasure in presenting to you one whom, I believe, needs no introduction to the farmers of Pennsylvania, Mr. L. W. Lighty.

MR. LIGHTY: Director Martin, Mr. Chairman of the Chamber of Commerce, Mr. McMaster, Mr. Campbell: I certainly want to thank you very heartily, thank you for myself, and thank you for the State Board of Agriculture, the members of the Institute Committees of the various counties and Institute lecturers for your kind words. You know words of welcome when we come into a strange country are always very pleasant. Nevertheless, I want to say that I do not feel as though I was in a strange country; I rather feel at home in Crawford county, possibly because about fifteen or sixteen years ago I came to this county the first time I was far away from home, because I am from that distant county—had never been across the mountains—but the people of the western counties and particularly the people of Crawford county, treated me so royally that I felt at home and I kind of feel at home to-day; I almost felt at home yesterday, even more so to-day, because the sun is shining warmer to-day than it did yesterday and even that is welcoming us as well as your bright smiling faces.

Now I have no speech prepared; I am glad I haven't; I can only second what has been said so much better than I could possibly say it and I do want to say that I am very glad to see so many of the old friendly faces here this afternoon and I want to say to these people at Conneaut Lake Exposition grounds that you are welcoming some of the good old war horses of agriculture in the State of Pennsylvania, men who have worked for many years, not including myself, please, but quite a number of the old members

of the State Board, the old County Chairmen that I have been working with side by side for a number of years, and when you welcome those old war horses in the agricultural world of Pennsylvania, you are welcoming mighty good men. And members of the State Board, as it has been stated already, are in this work for the love of the work, they do not expect any pay and they do not get any pay. They spend a week, they spend two weeks, they spend a month in real, genuine hard labor in the upbuilding of the agriculture of their various counties. The President of the Chamber of Commerce called our special attention to the great amount of water, this beautiful large sheet of water, and from what he said, I think that he possibly is laboring under a misapprehension; he imagines that we do not have such a great abundance of water over in the eastern end of the State. While it is not a quiet body of water, we have a broad stream about one and a half miles wide flowing down through the eastern half of the State and we have a great abundance of it continuously. Maybe that is explained because we do not drink much of it over in the eastern part of the State. But we are glad to be welcomed over here into your very beautiful country west of the Alleghenies, particularly in Crawford county. I think that really it is the heart of the country west of the Allegheny Mountains.

Now, I believe you are going to have a first class good meeting. I do not want to consume too many minutes of your time. You have a splendid program. You have a free platform as was stated by the Director of Institutes and that is the good part of the Farmers' Institute and the Farmers' Normal Institute, the free platform where you are at liberty all the time to ask questions and I hope you will make good use of the time and your privilege. Again I thank you, thank you sincerely for the cordial welcome that you have extended me.

THE CHAIRMAN: The Director of Institutes informs me that it will be impossible for Prof. Helmer Rabild to be with us at this session, so we will take up the second subject on the program, "Diseases of Farm Animals," by Dr. C. J. Marshall, State Veterinarian, Department of Agriculture, Harrisburg.

DR. MARSHALL: Mr. Chairman, Ladies and Gentlemen: Not long ago Mr. Martin asked me if I would attend the Institute and read a paper or talk on some subject before a meeting that was going to be held at Conneaut Lake. Whenever I hear the word Crawford county mentioned, I think of associating it in some way with stock breeding. I know that Crawford county is one of the best horse raising counties in the State, and stock raising is one of your industries, and for that reason the subject suggested itself that I should discuss here this afternoon. I prepared a paper on the subject of Infectious Abortion. I hope none of you have ever had any experience with it, but I know that we do have considerable trouble with it in certain parts of the State and I trust it will be interesting to you.

Dr Marshall then presented the following paper:

INFECTIOUS ABORTION

DR. C. J. MARSHALL, *State Veterinarian.*

Among the many perplexing diseases that afflict our livestock, the subject selected for consideration to-day is one of vast economic importance. It has been conservatively estimated that infectious abortion exists in about 20% of the breeding herds in this country. Practically 50% of the pregnant animals in newly infected herds abort. In some cases as high as 100% have been known to abort in certain years. The losses in young animals year after year in infected breeding herds are placed at 20%, and the money losses in infected herds is averaged at about \$35.00 per head. In dairy cows that abort there is a decrease in the amount of milk produced. The act is likely to be followed by temporary or permanent sterility, udder diseases, septic condition of the uterus and a total loss of many calves.

This form of abortion has been known to be infectious for more than a century. The "Complete Farmer," an agricultural paper published in England, speaks of the disease as contagious as early as 1807. Sensible advice was given in this article in reference to its spread and how to control it. Professor Bang, of Copenhagen, who has done so much good work on many important diseases of animals and especially tuberculosis, discovered the true cause of the disease in 1896. The organism that causes it has been named the bacillus of Bang in honor of its discoverer. His discovery has since been verified in many countries. It has been found in practically all countries where cattle are kept. True infectious abortion in cattle is always due to the bacillus of Bang. The disease is found in nearly all species. In animals except bovines, however, the disease is not due to the bacillus of Bang. True infectious abortion of cattle has been transmitted experimentally to other species but under natural conditions that of one species of animals is not carried to another. It is uncommon to find two or more species of farm animals afflicted with infectious abortion at the same time. The disease is of the most importance in bovines. Mares are not seldom afflicted with a form of infectious abortion in the horse breeding sections of Pennsylvania. Abortion in animals has been recognized for centuries. In the XXXI chapter of Genesis, the 38th verse it speaks of sheep and goats casting their young. The condition is not always due to infection. Isolated cases are usually due to fright, injury, certain poisons, diseases like anthrax, foot-and-mouth disease, excessive activity of the milk gland, etc. The relative frequency of infectious abortions as compared with those due to accidental causes has been observed by one veterinarian who kept a record of three hundred cases. He found that two hundred and eighty were due to infection and the balance to other causes.

Breeders frequently speak of the condition as slinking, slipping, casting, picking, etc. The disease is easily recognized in a herd. It is not so easy to pick out the infected animals. The diagnosis is usually made by the history. Where several animals abort during the season and no other cause can be found, one is usually safe in

judging it to be due to infection. It may occur any time during pregnancy, but is most common from the fifth to the seventh month. The average period of gestation at which 240 cases aborted was 6½ months. Young cows are more liable to abort than the older members of the same herd. Other valuable observations made on the 240 head of aborters showed the average age at which it occurred to be 4½ years, 8% aborted a second time, 2% the third and 168 retained the afterbirth. No symptoms are observed usually till just before the act. They vary to a certain extent with the period of gestation. In the early stages no clinical symptoms may be detected while toward the end of gestation they simulate more closely those of normal parturition. The calf may live any time after the seventh month of the period of pregnancy. Seven months calves are said to be more liable to live than those dropped at the eighth month and usually thrive better. Aborted calves are, as a rule, ballers, thrive badly and die or should be destroyed as worthless.

In order to detect infected individuals in a herd, laboratory methods are useful. Many different plans have been tried, but up to the present the best results have been obtained by an examination of the blood or what is known as the complement fixation test. It has been possible with this test, to detect practically all of the infected animals in a herd. To do this work properly it is necessary to have a laboratory well equipped and a man especially trained in bacteriology. Our State is fortunate in being provided with the necessary equipment for studying this disease and many others that are difficult to diagnose. In large breeding herds where the owner desires to eliminate contagious abortion, this test is practically the only alternative. By its use infected animals can be segregated from those that have recovered or that have not yet become infected.

It is possible to establish a diagnosis of the disease in a herd from a post-mortem and laboratory examination of the foetus, foetal membranes, etc. In formation obtained in this way is too late to be of practical service.

In order to control the disease it is necessary to consider the various ways in which it has been spread. There are several important factors. It should be remembered that the bacillus of Bang is the only cause of the disease in cattle; that it lives, thrives and multiplies in the foetus, the fetal envelopes and uterus, and that it lives but a short time outside of the pregnant animal. This is one important reason for not breeding infected animals for about three months from the time abortion occurs. The most usual form of introducing the disease in a herd is in the purchase of new cows. It is possible, however, to get the disease from the male. It is spread in a herd principally by feed that is contaminated with the infected foetus, fetal envelopes or vaginal discharge. Professor Bang was the first to discover the fact that the disease is spread by the food. The surest way in which it can be transmitted is by intravenous injections. In this way it has been possible to discover important facts in reference to the period of incubation. The time from which virulent material was injected into the blood to the time of abortion has varied from thirty-three, to two hundred and eighty-one days. The average in ten cases was one hundred and twenty-six days. Artificial infection is believed to produce the disease more quickly than where it is contracted under natural con-

dition. An infected animal may abort before she is placed in a herd and still carry the disease to the new herd, or she may be infected at the time of purchase and carry the foetus for several months and then abort, other animals in the herd may then follow in from six to eight months. When the disease is once introduced into a herd it will remain for years unless necessary measures are adopted for its extermination. There is no doubt but that a certain degree of immunity is carried; it is unusual for animals to abort the second time and still more so the third. Where nothing is done to check the disease the old members of the herd cease to abort and it is confined principally to the heifers and will continue in them from year to year.

As a result of abortion, disagreeable complications may occur. Animals that carry their calves to five months or more are frequently afflicted with difficult parturition and assistance is often necessary to deliver the calves. Milk fever seldom occurs after abortion but has been observed in certain cases. Retention of the afterbirth is not unusual and if not properly treated it may result in inflammation of the genital organs and even death of the animal. In some cases inflammation of the udder, or what is commonly known as garget, follows as a result. One of the worst complications in contagious abortion is sterility and many otherwise valuable cows cease to breed. This may be temporary or permanent.

It is possible to prevent or exterminate this disagreeable disease, yet it is necessary to exercise care in doing so that is beyond the ability of the average breeder. One common mistake that is frequently made is to sell animals that abort. This is locking up the stable after the horse is stolen. It is considered better in most cases to keep such animals and take advantage of the immunity that has been produced. In small dairy herds it may not be the best form of economy to spend the money and effort necessary in exterminating the disease. In breeding herds it will prove the ruination of the business if it cannot be checked. One should exercise extreme care in purchasing new animals. It is not advisable to use the same bull on several herds. The animal that aborts should be isolated and kept isolated so long as there is a discharge. This may disappear in a week or may extend for a month or more. Aborting animals should not be bred for about three months in order to give the organisms that produce the disease time to die under normal conditions. The foetus should be disposed of in a way that it cannot spread the infection; it may be covered with fresh burned lime, chloride of lime, buried, boiled or burned, but should not be allowed to remain on the pasture, in the barnyard or any place accessible to cattle, other animals or man. The same is true of the afterbirth. The vaginal discharge is equally as infectious. For this reason it is best to keep the animal confined and not permit her to travel over pasture fields or territory on which susceptible animals are allowed. During the first few days vaginal douches are useful. Various remedies may be used for this purpose. One of the best is a one-half of one per cent. solution of lysol in warm water. It is prepared by adding two tablespoonsful of lysol to five quarts of warm water. This amount should be administered once daily from a vaginal douche or a fountain syringe for about the first week and continued longer if any discharge is observed.

The posterior parts of the cow should be kept clean with a solution of the same strength. The droppings from the animal should be covered twice daily with fresh burned lime, chloride of lime, a saturated solution of bluestone, or some other good disinfectant. The animal is considered fairly safe to be placed with the other animals as soon as the discharge ceases. It is important to be certain that the discharge has stopped permanently.

In a breeding herd where the disease has become established it may be advisable to detect by laboratory examination, if possible, those that are infected, and separate the infected from the non-infected. Practically the only treatment in these cases is to keep the two groups separate and treat any that abort as described above. The heifers should be kept apart from the main herd and a special bull kept for service for them.

It should be remembered that there is no specific medicine that will cure contagious abortion. There are many patent medicines on the market and in many cases their merits have been over-estimated from the fact that natural immunity has been the cause while the medicine received the credit. In certain cases good has been accomplished by the use of advertised treatments for the reason that isolation and sensible advice has accompanied the use of the medicine. Recently considerable attention has been given to the use of medicated methylene blue. This treatment has been tried extensively under the direction of the State Livestock Sanitary Board. Some breeders have reported good results from its use but it is believed that in most cases this is due to a mistaken idea as numerous cases have been observed where equally as good results were obtained with as without this treatment. The carbolic acid treatment has been advocated more extensively than the medicated methylene blue, and some good observers have ascribed some benefit to this remedy when used either subcutaneously or by the mouth. In 1905 the English Board of Agriculture appointed a Commission to make a special study of this disease and among other treatments carbolic acid was given a trial. The report of this Commission shows no benefit derived from the treatment, and this is the consensus of opinion among those best qualified to judge.

The danger of transmitting the disease from the bull is not so great as at one time was believed, yet in exterminating the disease from a herd it is necessary to give consideration to the male as well as to the female. No symptoms are usually observed in the bull yet he is likely to transmit it. It has been decided that clipping the hairs around the prepuce and using the same injections as recommended for the cow is advisable. This should be done especially where bulls are used in more herds than one, or in other herds that are not known to be free from disease.

In considering the subject of infectious abortion, special attention has been given to the disease in cattle for the reason that it is of much more economic importance in this species. It should be remembered that a form of infectious abortion may be found in nearly all species of domestic animals and when this occurs the prevention and treatment recommended for cattle will apply equally as well to others.

The CHAIRMAN: That concludes the program for the afternoon session.

DIRECTOR MARTIN: I trust you will all remain. We desire to have a roll call in order to get a list of those present. We will have the roll call now and then after the roll call we have a very interesting gentleman from New Jersey here. They report there that a great portion of his living comes from asparagus; that he is a great grower of asparagus and he has some samples with him that we will desire to see. After the roll call then Mr. Hulsart will talk for a little while on this subject I have mentioned.

The roll was then called and at this and subsequent roll calls, the following members responded:

COUNTY INSTITUTE MANAGERS

A. I. Weidner, S. S. Blyholder, W. F. Biddle, H. G. McGowan, F. D. Kerrick, B. F. Wambold, W. H. Milliron, L. J. Bearer, Edward Lienhard, M. E. Conard, J. H. Wilson, Joel A. Herr, A. P. Young, W. F. Throop, T. J. Ferguson, E. S. Keiper, Archie Billings, C. A. Randall, Frank Ranck, S. C. George, Matthew Rodgers, Horace Seamans, J. W. Bruckart, Edward Shuey, J. E. Hildebrant, B. F. Kahler, Sylvester Shaffer, E. A. Stuholme, W. C. Black, F. S. Brong, J. Miles Derr, C. S. Messinger, I. A. Eschbach, C. M. Bower, B. F. Killam, A. T. Crittenden, John Schoener, F. F. Glass, Robert W. Lohr, F. A. Davies, G. A. Woodside, Jas. M. Paxton, W. E. Perham, J. Newton Glover, W. A. Crawford, W. F. Holtzer, G. A. Benson and G. F. Barnes.

INSTITUTE LECTURERS

H. M. Anderson, M. S. Bond, J. T. Campbell, Fred W. Card, Prof. Wells, W. Cooke, E. B. Dorsett, F. H. Fassett, S. L. Faust, Sheldon W. Funk, H. M. Gooderham, J. Stuart Groupe, J. A. Herman, John D. Herr, Wm. Horrocks, C. C. Hulsart, Frank Kline, L. W. Lighty, Dr. Hannah McK. Lyons, Prof. T. I. Mairs, M. H. McCallum, Prof. Franklin Menges, Howard Mitman, C. R. Orton, W. M. Patton, E. L. Phillips, Dr. W. T. Phillippy, Chas. A. Row, Robt. S. Seeds, R. S. Smith, W. H. Stout, Vern T. Struble, W. H. Tomhave, Leon Otice Van Noy, D. H. Watts, W. Theo. Wittman, R. J. Weld and E. L. Worthen.

MR. JOEL A. HERR: I want to know what is wrong in the program with Lawrence and Lancaster counties, that they are not recorded on the program and the names of the Institutes workers called out?

DIRECTOR MARTIN: Lancaster county is recognized. Lawrence county, I guess, it was the fault—probably we will blame it on someone not present, the printer. You are aware that after we arranged this program, this bulletin, we were hurried very much, the State printer was exceedingly busy during this winter season and the spring. After we had once proof read this little program we sent it to the printer and by some accident two or three mistakes occurred of the kind mentioned here in the bulletin. We did not take time to correct them. I know I could make an excuse for my own county. We had only one proof read of this and they are doing the legislative work and we are very fortunate to get the program at all.

MR. SHAFFER: It was not missed on the program I have got.

SECRETARY CRITCHFIELD: I think that Lancaster and Lawrence were both called.

MR. WELD: I called Lancaster and called Lawrence.

A Member: Mr. De Witt came as far as Beanville and was taken sick and had to go to bed; I don't know whether he will be here or not.

DIRECTOR MARTIN: I received a letter from Mr. Beck, of Blair, stating that he had contracted a heavy cold preventing his attendance. Now we will be pleased to have Mr. Hulsart make a little exhibit of that asparagus and explain how he raised it.

MR. HULSART: It seems to me the easiest thing in the world for a Jerseyman to get into trouble. Now I thought it would be rather nice to bring out a bunch of our Jersey asparagus and I intended it for friend Martin, though I haven't told him so yet, then he goes to work and springs this on me. Now it is just like—friend Campbell will bear me out in what I am going to say—the early chicken that gets out in the morning and goes and catches a worm and brings it back and somebody else takes it away from him. Some years ago I traveled over the State of New Jersey with friend Campbell in Farmers' Institute work and he was just as enthusiastic when he was in New Jersey as he appears to be this afternoon in Crawford county. But there is one thing he cannot do, he cannot beat New Jersey sand growing asparagus and I think he knows it. You haven't the soil, not that I have seen so far in Crawford county; you know that is the beginning. It is practically impossible, friends, to grow that kind of asparagus on clay land, not that it might not be grown as large, but it will be all sorts of shapes and it will come through the soil turned over and leaning several different ways from Sunday. You must have asparagus soil to grow that kind of asparagus. Furthermore, you must have seed from which to plant. Now, everybody knows that; what I am driving at, is just this, you can't go to a seedsman that is dealing in seed commercially and get seed that will grow uniform asparagus.

A Member: Or anything else.

MR. HULSART: Right you are. Now I'm going to give you two or three examples. The first bed of asparagus that I ever grew in my life I applied to an acquaintance for some asparagus seed from his plantation. The answer that I received was that if he had any left when he was done planting, he would be glad to supply me. Now, I was naturally in a little hurry and I could not wait on that fellow, and so I went to the largest seed house in the City of New York and bought five pounds of asparagus seed and brought them home and planted them in the nursery bed and I grew the plants for a year. Then I set the plants in two acres and a half of land and manured it as well as I could afford to, put on commercial fertilizer and attended to it three or four years, lost about seven hundred dollars and then plowed it up and had everything you ever

heard tell of from the old asparagus shoots along the seashore to everything you ever heard tell of, except what I bought and paid for, I didn't have a single bit left of true Palmetto. The seed that produced that bunch came from the man I spoke of, the following year; that was cut yesterday forenoon from a bed now starting on its sixteenth year. I did not bring that bunch to advertise anything before this audience at all. I wanted to show a few friends what asparagus will do along the southern shore of Raritan Bay when it becomes 15 or 16 years of age.

The question has been asked, "How long will a bed last?" Nobody knows; some, ten or twelve or fourteen years, and other beds twenty or twenty-five years; it depends largely on the soil and the man who is farming. If the subsoil is porous for four or five feet, an asparagus bed will last much longer than if it has a clay bottom two or two and a half feet from the surface. An asparagus plant has a tendency to come up, and once it gets near the surface, it is almost impossible to get the shoots of size and get them of length. In planting the plants in the field, we plant them in a trench as deep as a two-horse turning plough will turn the furrow going once in each direction, turn it and come back in the same row and plant the plants in the bottom of the furrow. Men have asked me, "Shall we put in manure?" I know men who advocate it and who have had success in doing it, but there is a reason for not doing it. In many instances the asparagus will do fairly well, provided that manure compost is put on the top of plants, but in many instances field mice get under there and dearly love to chew the little roots and we have a ragged plantation.

Never put manure underneath an asparagus plant when you are going to plant it; the plant will start better, grow faster and be a larger plant at the end of one season, if planted on a hard, solid bottom. Some of our scientific writers, some of those who I suppose never set an asparagus row as long as this hall in their lives, advocate making a little mound of earth with the roots, so that they will spread out in a cup shape. Suppose a man has four or five acres to set; how long will it take to plant them that way? Many things work out splendidly on paper, but when the sun is shining on your back and you get out at six o'clock in the morning and stay until six at night, bent double, that mound question will soon be forgotten. I have been there till my back ached and I set them right on the bottom of the furrow and with no manure. Plant your asparagus, plow it, put on manure and the more the better, all your pocket will stand, if it's twenty-five tons to the acre. I have a bed of asparagus seven or eight years old and there's just a trifle over three acres in it, and I put on forty loads of New York stable manure before I ever plowed it at all. First, I grew them all summer and then plowed them with a two-horse plow away from each side of the row and put a ton of manure to each row in November and then plowed the soil back.

A Member: How much manure do you call a load?

MR. HULSART: 2,200 or 2,300 pounds, practically a ton to the row, is what we put on. It has had two or three applications of manure between that time and now. After we get a certain amount of vegetable matter in the soil, we can grow good crops with commercial fertilizer.

A Member: How is manure out of a mushroom house?

MR. HULSART: In connection with commercial fertilizer, it will be ideal. All you get is the humus making material from that manure; the plant food can be supplied much more cheaply in fertilizers. Now remember this, when we come to feeding an asparagus bed, first we have got a row of plants that takes one year, that is grown in a nursery row, now we have got one writer, W. F. Massey, of Salisbury, Md., who is continually advocating planting the seed where it is to remain, he saves a year. Granted, but if he was to plant four or five acres and then try to keep the bugs off of those young plants and keep the weeds out, I think he would prefer planting them in the nursery row where he would have them in a small space not larger than one side of this hall. When a young asparagus plant comes through the ground and the asparagus beetle is as thick as we have them in old asparagus sections, two or three or four light on that plant in three hours and it is doomed. What man or what body of men on any one farm can cover three or four acres of land and watch it close enough? We plant them in a nursery row and plant them close by home and turn the poultry loose and you will never have to put on any poison, the poultry will take care of it; then take the plants one year old and you will have the best bed at the end of two or three years. Set them in the field after plowing under 10 to 12 tons per acre of manure and set the plants right in the bottom of the furrow, and as soon as those plants begin to grow, put on an application of four or five hundred pounds of good potato fertilizer.

A Member: How deep do you set them?

MR. HULSART: About 8 inches from the natural level. I have had friends tell me a foot, but they measured from the top of the furrow. I use a No. 20 Oliver chilled plow. If the soil was 11 or 12 inches deep, I would say, "Go down ten inches, if you can, but never go more than half an inch, if possible, into the subsoil, or the young plants will not thrive." They will not thrive until the roots get up into a soil that has soluble and available plant food in it. We want to keep the root system down as far as we can. Every new set of roots comes out on top of the old ones. Now, when they become about $\frac{3}{4}$, sometimes $\frac{1}{2}$ an inch thick, then that crown is that much nearer the surface; next year another layer comes up on the top. If we have got the greatest amount of feeding surface close to the surface of the soil, those roots will work out where the feed is rather than go down. If we have got the greatest amount of plant food available down there, 7 or 8 inches, that root system is going to stay down there and you can plow over it and not do a great of damage.

A Member: How old do you let your asparagus become before you begin cutting?

MR. HULSART: I cut it when it is one year old for about 4 cuttings. I set it this April and cut it next season about 4 times or possibly 5; if it has been well cared for and well fed, it is better cut 4 or 5 times than if you didn't cut it at all; it helps to develop the crown.

A Member: How do you control your weeds through the season?

MR. HULSART: By hoeing and cultivation, either the gang cultivator, the one horse cultivator or the hand hoe, and sometimes cutting by hand.

A Member: What do you mean by cutting 4 times?

MR. HULSART: Four different cuttings. For instance, we will cut the first cutting on Monday; when there comes another crop of shoots up, it might be Wednesday or Thursday of the same week, or two or three days later, about 4 or 5 cuttings; the warmer the weather is the faster they come, the less cuttings you want to cut because you want to get more in each cutting, you don't want to rob it, just enough to develop that crown, make it uniform, more buds. Now that coat of manure plowed under there will stand by that asparagus longer than any other application that is put on it.

A Member: Whereabout do you cut the shoots off?

MR. HULSART: Oh, just above the crown and sometimes you cannot always do that, it is down there in the dark; you take your chisel-bladed knife, some use a square one. I have seen growers that use the concave knife. I use a fish-tail knife and the point is notched, ground on one side. I like that for this reason, because in shoving it into the ground, the corner just hits a shoot, draws the knife to the spear and the spear to the knife, and its got to cut off. Now asparagus—right there on that knife question, lest I forget—asparagus never wants to be planted on land that has got stone in it. Any man that tries to cut asparagus half a day on land with stone in it, he wants to leave his religion in church before he comes away because you can't keep a knife sharp and the spears come through crooked. Weeds in asparagus do not harm a knife to get it, but you cannot grow asparagus—from 10 to 25 spears will make a bunch of that size—with weeds on the land. Asparagus is a hungry crop, taking anywhere from 8 to 10 loads of manure to the acre and half a ton of fertilizer and from 200 to 300 pounds of nitrate of soda. Now if we are going to furnish that amount of fertility, and let weeds take out the greater part of it, take out the moisture that the plant needs, the next year the fellow that grew his asparagus separate from weeds, will cut more bunches, larger grass, and the larger the grass, the cleaner the grass, the better looking it is, not only the more bunches he will gather, but the larger price he will receive. I don't know of anything where the appearance amounts to as much in price on the market, as we have to sell ours. In New York City, asparagus is selling from \$2 to \$3.50 a dozen and the fancier

it is, the higher the price. The freight is as much on low priced asparagus as on the medium or high-priced, the only thing that is any higher is the commission. It pays to grow grass as good as we can and as large as we can. We often hear tell of 2,000 bunches of asparagus to the acre. You have heard tell of 100 bushels or more of corn to the acre, but Pennsylvania doesn't average hardly 40 and there is very few men that cut 2,000 bunches of asparagus to the acre; my average is 1,500 on 5 or 6 acres and I find that my neighbors are not cutting any more. Some seasons it cuts more than others. Now I seemed to have created a little thought here and that is one of the objects of a man on the platform. I don't suppose there is a commercial asparagus grower in this audience. If there is, I made a wrong guess, but I said I have created thought, and if you will ask any questions along any line of asparagus growing, if I am able, I will try to answer them.

A Member: How many different kinds of asparagus are there?

MR. HULSART: Palmetto and the Argenquill are the only two kinds that I grow, but there are numbers of others.

A Member: Does bleached grass bring more on the New York market than green grass?

MR. HULSART: No.

A Member: What is your object in ridging it so high?

MR. HULSART: To have length to the spear without injuring the crown.

A Member: We find in our own growing that the blanched grass does not sell as well as the green grass.

MR. HULSART: But you get more of it. In order to get them green, they have got to stand a day or two longer to get green; it all comes from bleaching it all one color.

MR. ROW: Won't it push through air sooner than through that extra amount of dirt? You said you wanted it white and we want it green.

MR. HULSART: No, but you have got to let it stand longer before you can cut it, and if you are an asparagus grower, Mr. Row, you know this, when an asparagus crown sends up 4 or 5 shoots, it does not send up any more until you cut them. If we cut ours to-day, we start a new crop. If you don't cut yours until to-morrow, you don't start a new crop until to-morrow, and the closer and oftener you cut it, the faster you start the new ones, and furthermore, it takes more shoots to make a bunch of green grass than of white. It is like putting a piece of hot iron through a rolling mill, the shoot gets smaller every inch it makes up after it comes out into daylight. I'd like to grow green grass, but I am in an asparagus section where you can look in any direction and see 3 or 4 or 5 acres of asparagus and anywhere from 30,000,000 to 40,000,000 bugs at certain times of the year, and these bugs will soon spoil the grass and that's what sells the grass, the tops.

A Member: How do you combat them?

MR. HULSART: I don't know. The only thing you can do is to keep them cut, you cannot use poison on that; humanity is going to eat it.

SECRETARY CRITCHFIELD: Can't you use tobacco? Humanity uses tobacco.

MR. HULSART: Yes, and so do the bugs, and they laugh at you, they won't turn out for any such little foolish dodge as that. It takes Paris green, and takes it strong. Our experiment station says, "Use 3 pounds of arsenate of lead to 50 gallons of water." Within 200 yards of where I am farming, I can cite an asparagus bed set two or three years ago and that farmer went there with his Paris green and arsenate of lead base, 3 pounds to 50 gallons of water, and the bugs only got fat, and then he put in 5 pounds and killed a few and then he got mad and put in 15 pounds and killed the bugs and didn't hurt the asparagus either.

SECRETARY CRITCHFIELD: Did he try the arsenate on himself?

MR. HULSART: No, that was a young bed, he was not cutting asparagus there. In a young bed, you must keep the bugs off. The making of an asparagus bed is in the first two years of its life, and if you let the bugs or weeds, through neglect of any kind, get possession of it any time during that two years, that bed will never be what it ought to be. I have a bed at home at the present time where one little corner got damaged by bugs and it never cut as well as the rest of the bed.

MR. J. ALDUS HERR: There is quite a good deal of asparagus sold in the Lancaster market and most of it is not bunched. The bunches are not as long as the one Mr. Hulsart has on the table. What proportion of that bunch you have there is edible? Is the lower part of it tough?

MR. HULSART: The lower part, Mr. Herr, has a skin on the outside. When that is taken off, the inside is just as good as the other. The housewife who is paying to-day \$.30 to \$.35 for a bunch of grass like that, will take the trouble, if she is a frugal woman, to peel that and use all of it. When it is cheap, they will break it like snap-beans until it begins to string and throw the rest away. We have enough crooked and broken—that all we use is about that much of it, but if we had to pay \$.30 or \$.35 a bunch for it it will say as the mule said to Bill, "It will be used a little lower down."

MR. J. ALDUS HERR: In the Lancaster market, they object very much to asparagus that you cannot pinch and it is fairly tender. They will buy the smaller and shorter bunch.

MR. HULSART: Well, in the New York market, the longer the bunch, the more money it will bring.

A Member: The education of either the Lancaster or New York people, I don't know which one, because as Mr. Herr says, the asparagus that is that tough kind on the outside, while I admit it is better, they simply won't buy it.

MR. HULSART: He says they prefer to buy the shorter bunch. That's easy. That bunch is one that we bunch for the New York market. If I were taking it to Pittsburgh, where they didn't want this part, I would shove the string up there and cut it two inches shorter. Then with us, we wouldn't have to bunch any short grass at all, it would be all one length. We have another grade there. You cut them a little shorter and they will have to be bunched by themselves.

MR. J. ALDUS HERR: Is that cut under-ground any at all?

MR. HULSART: Oh yes, that is cut under-ground all the way from here, 4 or 4½ inches. We use a chisel-bladed knife that length, illustrating, it is not all blade that length; it is on to a ¾ inch iron rod; the blade is about 4½ inches long; that shoves right down into the ground. Are there any other questions?

A Member: What would be the best asparagus to plant for home garden use? Palmetto?

MR. HULSART: I like Argenquil fairly well, but would just as soon have this and a little rather, for home use. You will not gather quite as large spears, neither will you gather quite so many of them. Personally, the best flavored asparagus is not the largest stalks. I'd rather have the medium sized stalks for my own consumption.

A Member: Did I understand you to say that it is advisable to plow a furrow away from each side of a row and put manure in that furrow? Is that in a mature bed?

MR. HULSART: No, in a young bed. If that is done, it wants to be done at the close of the first growing season after the plants have been put down into the row. In a mature bed, I want it right down the centre, midway between the two rows. I know farmers that manure right on top of the row, but the feeding is not there at all.

A Member: Could you renew a bed that has been neglected in the way of feeding and might be 10 or 12 years old? Could you renew that by an application of manure?

MR. HULSART: If the crowns are not too near the top. If it is only a garden plot, I would say yes, but if it is for commercial purposes, you have got to cut the grass so near the level of the surface of the land, that I am afraid you would have trouble even though that is green grass. The knife is thrust under the ground a little way and as soon as the crown gets up level with the surface when the knife is thrust in, you are all the time pricking the crown with that knife and damaging the buds. These that you damage a little start to grow and come up and you grow crooked, deformed

spears and all that is waste. I'd rather have the manure down the centre of the row as deep as you can put it and if it goes right in between the rows, it doesn't make much difference. I want the greater part of my soluble fertility put on after the cutting season is over. No amount of manuring early in the spring will do that cutting any good. You are manuring for next year's crop. You cannot form plant food that will build cellular tissue until you have got a green top, and as long as you are cutting the shoots every day, you have no green top. The greater part of the manuring should be after the cutting season ceases, and you store up fertility for the next season; at the same time, that plant is making eyes to send up shoots for next season's crop. We quit cutting between the 1st and 4th of July, always try to get cleaned up so we can shoot fire-crackers on the Fourth.

A member: What does the producer get for those 1,500 bunches to the acre?

MR. HULSART: Ash the hard questions of the other fellow, don't you put them at me. If we are getting \$3.00 a dozen or \$2.50, it would be easy figuring, but one day or two days we may be receiving \$3.50 and the next week the weather changes, it comes hot enough to make you stroke your brow and down will come the price to \$1.75 or \$2.00. If you will tell me what the price is going to be until the 1st of July, I can answer the question fairly well. Unless you can tell me that, I cannot answer the question. We start somewhere around \$3.25 to \$3.75 and sometimes take as low as \$1.50 and then comes a little cold spell like last week and up it will go to \$2.50 or \$2.75, sometimes \$3.00. The average good acre of asparagus through our section runs somewhere around \$200 an acre. I know some men who claim to get \$250 an acre; I don't want to set anybody crazy thinking they are going to get rich growing asparagus because I happen to come here, and if they meet me somewhere else after they have made a failure of it, have them hit me back of the neck because they made a failure of it.

A Member: Where can they buy pure Palmetto seed?

MR. HULSART: Of some grower; never go to a seed-store.

A Member: Do you know who is the grower?

MR. HULSART: Oh, there are several; I am one myself, but I am not here to advertise asparagus seed. We go into an asparagus section, go where we know there is a good bed; that's where I got that seed from.

A Member: Do you have seed for sale?

MR. HULSART: Most of the time, yes. I am no seed grower, but from the very question that you just asked—now at Farmers' Institute work, I came to the conclusion some five or six years ago, wouldn't it be wise to gather a little good seed and have it on hand when that question was asked, and I suppose I have been asked that very question fifty times before and that is the reason I did it, but I make no business of growing seed.

A Member: After you quit cutting and the top grows up probably 3 feet high, when do you cut that off?

MR. HULSART: I don't cut that off until about time spring is opening, and the frost is leaving the ground. In my section, we don't have much snow and sometimes when we do have snow, it is all over along the fence. I'd rather have it in the field and if we leave the tops on, it doesn't drift. About the time the frost is going, I have men go up and down the ground with a sharp hoe. It doesn't take very long. Remember, the asparagus plant grows seed on one plant and fertility on another plant. There's male and female plants in asparagus and the plant that does not produce seed is always the best crop producer. When the man comes forward that can pick out the male plants from the females and set our beds from that kind, we will be able to produce a greater yield of asparagus. If you are going to set them out and wait until they seed and go back and set them into permanent beds, you will lose more than you will gain. I know one man that claims he can tell a great many of them. How near he is doing it, I don't know. In his own field, he does it by the shape of the bed when they are one year old. How near a success he is making, I don't know. I don't claim to be able to tell them at all. If I could, I wouldn't set anything but the male plants, they are the best crop producers. Friends, I thank you for your attention. Mr. Martin, will you take that home with you?

A Member: Mr. Hulsart, what do you think about hibernating insects in the tops standing over?

MR. HULSART: The asparagus beetle hibernates under shelter of any kind. If they have asparagus beds in the open where there are no fence rows, wood or collection of trash, the bugs will go to a distance to hibernate. If you have got leaves the trash, etc., they will get under there. I have known instances where men put things around the asparagus field for them to go under and when they get them gathered together in their winter quarters, then they destroy them. The only way the farmer can get clear of the great crops of asparagus bugs, is to follow up the late brood and poison them, but men are so busy at that time of the year that it is practically impossible. They come in seasons. One crop of bugs will come and they will lay their eggs and finally will disappear. They hatch, grow to be adults, and they will be on hand for a week or ten days and then they will disappear. Towards fall another crop comes and they grow up and hibernate in the leaves and trash around the edge of the field, and if the tops are heavy enough to get under there, they will do it, but very few of them because the tops do not fall down until windy, cold weather or snow comes and the bugs are all in winter quarters before that time; but if the farmer could do thorough spraying in the latter part of the season, we would do away with a large part of the bugs.

A Member: Is it good to have straw around the entire bed for hibernating purposes and then burn it?

MR. HULSART: That would want to be done along about the forepart of November, not much sooner than that, when you are sure everything is hid away under there. That will destroy them. I have known that to be done where there was trash and leaves around the row, burn them off and you will destroy thousands of them that way.

A Member: I have three rows about 50 yards each and so far I have not seen a bug on them. I suppose I will get them there sometime.

MR. HULSART: I wouldn't be surprised. All of this insect question comes where a certain crop is grown in quantity all over a neighborhood. Where there is only a little, there is not much inducement for the bugs unless they are nearby, you don't find it. A few years ago I set three-quarters of an acre of gooseberries and I know people that were bothered to death with currant worms. I never saw one in my field and it is the only piece of gooseberries anywhere in the neighborhood, but let a dozen men plant gooseberries and everybody will have currant worms. A little small piece of asparagus is not going to be bothered while it is isolated from the general cropping sections.

MR. BOND: I just want one minute to give my sincere indorsement to the manner in which that address was given. A man who achieves anything for the Farmers' Institute in the future, has got to adopt his manner, he has got to give us the exceptions as well as the rule. We have been given the rule long enough, laid down as a fast rule, but it is the exceptions we want to know something about.

The CHAIRMAN: We have our friend, Robert S. Seeds with us; we are going to call on him for a short time. We have a few minutes left before adjournment.

MR. SEEDS: Mr. Chairman, Ladies and Gentlemen; I want to say to Brother Campbell that I want to thank him from the bottom of my heart for the welcome he has given us coming into this county. I have traveled with him and know him well, and know his county, and I assure you, my dear friends, that the longer I live and the older I get, the more delighted I am to come and mingle with my fellow-men. God help the man who knows it all, and lives by himself; he is to be pitied. And when a man labors and makes some money, instead of laying it up to ruin some boy or some girl, he should get something out of life and become broader and greater and a better citizen for his community and the state in which he lives. Not long ago, my friend Hubbard, who went down on the Lusitania, was lecturing to the bankers of Pennsylvania at Bedford Springs, and said: "Gentlemen, not long ago I visited an insane asylum where the people were crazy. I noticed that a single keeper had a dozen men out walking and giving them exercise, and I went to that keeper and I said to him 'Do you realize the danger that you are in? Suppose these twelve men should get together, they'd hammer the life out of you and run off.' 'Why,' he said, 'you don't know the danger you are in from these twelve men if they would get together: 'Yes,' the keeper said, 'but they can't get together.'"

God help the people who can't get together. A friend of mine was going from one town to another down south and he and his friend were being hauled in a spring wagon with a mule, and a colored man was doing the driving. He noticed in going along that the old colored man would take his whip and pick a bee off of a leaf, would pick a worm off of a stalk or stem; he was an expert with his whip, and after while he came along to a hornet's nest hanging on a limb and they said, "See, if you can bring that down with a crack of your whip," and the nigger said, "No sir, Boss, dey'se organized."

Now that's what it is to be organized, and nobody has watched this more closely than I have within the last twenty years, and right now I notice in this program that the first topic on this question this afternoon is "Community Breeding"—is that correct or "Community Building?" Well, you could get that community building, and right now, from one end to the other of this great and glorious country of ours, at the Chautauquas, at public meetings of this kind, men are breaking their necks to write an essay or a speech and commit it to memory, starting out to build communities, and I want to tell you, my dear friends, the man who takes the platform to talk the building of a community, I want him to begin using the personal pronoun "I" and stick to it until he is through. There is no place under God's Heaven where a man should begin community building more than right in his own neighborhood, that is the place to begin; let him begin at home. I tell you I am from Missouri, I want you to show me. I want to look at it, and I know they will tell you—they can't tell you, you can't do it. The business men of Pittsburgh, backed up by the Chamber of Commerce, 122 men, visited twenty some towns last week. This evening one week ago, in Altoona, I was invited up to talk at their reception, and in that speech I happened to say, speaking to them of what they were doing, I said I was the first man in Pennsylvania to raise alfalfa that I know of and there wasn't anything that I said to the business men of Pittsburgh that they applauded like they did when I stood up before them and boasted of being the first man to raise alfalfa in Pennsylvania. I say this to show how broad those men are in Pittsburgh. I know the church members at Birmingham, Pa., stood at the Birmingham Church and said, "You can't do it," when I talked about raising alfalfa some years ago. They said, "You can't do it." The scientific men told me not to talk it, that it wouldn't do in Pennsylvania. They said, "You can't do it," just like a man in St. Paul. He was out one evening and met some friends and he got so drunk he could scarcely get home, and he started and on his way home he had to go through the movie district of St. Paul, and going along the pavement, he staggered up to an electric light pole and got hold of it and looked up and saw an electric sign that said, "Home, Sweet Home in three reels," and he said, "You can't do it." Like the poor fellow who went to the hospital, and the operation was performed and he was on the operating table, had come to, and a fire broke out across the street and the Doctor said, "Pull down the blinds, this fellow will come to and think the operation was a failure." Making communities, making them better, that's what we want to do, and not long ago, my friend Lighty took supper at my home which was the great-

est pleasure I have had for sometime, but after supper, walking out over our farm which has almost been ruined the second time by a lumber job—we were walking over a mowing field that had the manure on the top of it and he looked at the manure and looked at the elevation we were on and he said: "Seeds, it is mighty expensive to haul this barnyard manure up a hill like this." I said, "It is all right, we can haul it up this hill and put it on a mowing field and not plow it down and beat the man who plows it down," and I haven't seen a mowing field in this great and glorious country—

MR. CAMPBELL: You haven't been to our place.

MR. SEEDS: I say to you that I haven't seen a grass field from Pittsburgh to this town this morning that looked as good as that mowing field that has the manure on top of it. That will be mowed and the top taken off and be a better field for corn next year than it was this year before the manure was put on it. Did you hear what this man said about this asparagus, about putting the manure on a year before to get the crop the coming year? Every now and then I come across a man who is turning around and backing up the things I am talking about. Of course, they don't like it. I have been called more liars than any man in the State of Pennsylvania. I like to pose as the biggest liar in the State because I stand in a class by myself. I know they find fault and say they don't like it. I have had it thrown in my teeth dozens of times. A man down in Pittsburgh not long ago, was working for Jones & Laughlin and a friend met him and said, "Are you still at Jones & Laughlin?" "Nor sir." "I thought you liked them, couldn't work any place else." He said, "I like Jones & Laughlin all right. I have been there a long time, but I didn't like the way the boss talked, and so I quit." "What did the boss say?" "Why, the boss said, 'you're fired.'" So my dear friends, the great thing in any line is the ability to come together, and I will tell you that—you can talk about stories and applications, but my friend Peachey told a story that not as long as I live, could I forget it if I wanted to and that is to back up the assertion that I am from Missouri and I want to see it, I want you to show me; that's the question; you can talk about theory, you can talk about how it will look and all that kind of business, but I want to see it, I want to look at it with my eye and Peachey told a story that I will never forget, of the old lady going across the ocean on a ship and she heard them talk about crossing the equator and she went to the Captain and said, "Captain, I hear you are going to cross the equator. I would like to see the equator." The captain said, "All right, you shall see it; and the day we cross it, I will take you out on the deck and adjust the telescope and you can take a look at the equator." And in a day or two, he said, "Come out on the deck and I will show you the equator" and he adjusted the telescope for her to look through and pulled a hair out of her head and stretched it across in front of the telescope and said, "Do you see that line in front of you?" "Yes, I can see that plainly." And the captain said, "That's the equator" and the old lady said, "I see it plainly, and I see a camel crossing at this time." So I want to tell you, my dear friends, that the man who starts out—I wrote an article for the platform of Chautauqua not long ago and in that article I made the statement that the man who steps on a Chautauqua platform—I know they have been saving us poor country people for

years and years and years, but the man who steps on a platform to tell the people how to build a community, I want to tell you, if I am in the audience, I am going to ask him what he has done to build any community in this country. I want to look at it; I want to see it and I want to see it with my eyes.

Right on my own farm where Mr. Lighty was the other day, you can talk about looking at alfalfa all you want to, how it will look and all that, but I like to go out and see it with my eye; I like to see it being cut with the scythe on the 1st of May and put on the wagon and hauled into the barn and see the pigs and the bull and the cattle eat it. I like to look at it; I like to see it with my eye. That is the part that cuts the ice; and I have seen it time and again, and you know what I would do if I had the power? I would go to Harrisburg and go before the legislature and I would say, "Gentlemen, I want so much money to pay the taxes on some farm in the centre of every county; we will pay the taxes on that farm and give it to any young man or any old man that will come out on it, give it to him for nothing and all we ask him is to take the farm and say 'Here, come and look at it and I will show you how to do it.'" I want to see things and I want to look at it, and that's where the particular part of it comes in.

It is nearly four o'clock and I didn't intend to make a speech, and haven't made a speech; I have simply talked to you, but I want to tell you, my dear friends, that as I travel from one end of this country to the other, my heart is getting into this work more and more every year, and getting into the practical part of it, and as I travel over the country I see wherein we can make the communities better if we unite and go hand in hand and shoulder to shoulder. We can make this country better every year, by building and making the communities better.

A Member: I would like to ask one question: We have all been trying this unity for some time, and it wouldn't unite. Now for a little experience of ours: About twenty-one years ago we built the silo; it was no credit to us, we were forced to build the silo. We waked up one spring and found the worms had eaten the grass roots up and picked the sward off like an old sheepskin, and we built a silo and I think I can point out half a dozen or more men who said once in a while, "You made me build a silo." I told them they would have to have a silo and after while they got it.

MR. SEEDS: That's good, that's all right, that's the way to do it. I know I do things every now and then and it is not long until a whole lot of other people do the same thing. I painted my house one time and painted the wall a stone color, white lead with lamp black put into it, you can color it to suit yourself, and we do things because we see other people do them and that is what makes the community and that is the way we learn from one another, and that is the way we do the practical part of it.

DIRECTOR MARTIN: Now, my friends, I want to call your attention to the evening program. The meeting will be called to order at 7.30 promptly. The subjects are very important as you will see by referring to the program. I know you will all be interested and will ask you to be here promptly at 7.30.

The Institute then adjourned until 7:30 P. M.

TUESDAY EVENING, 7:30

Mr. William C. Black, Chairman.

The CHAIRMAN: The house will please come to order. The first subject on the program this evening is "Agriculture and the Public Schools," by Prof. L. H. Dennis, Expert Assistant in Agricultural Education, Department of Public Instruction, Harrisburg, Pa.

The address of Prof. Dennis is as follows:

AGRICULTURE AND THE PUBLIC SCHOOLS

PROF. L. H. DENNIS, *Expert Assistant in Agricultural Education, Department of Public Instruction, Harrisburg, Pa.*

Mr. Chairman, Ladies and Gentlemen: On a recent trip throughout the Middle Western states—I say recent, it was about a year and a half or two years ago—it was my pleasure to go through the Ford Automobile factory, located at Detroit. Visitors have access to nearly all parts of that great and wonderful factory. The most interesting thing that one notices is the system that prevades every shop. We were told, as we were taken through the various departments, that it is possible for the manager of that great factory to find out at any time of the day, the exact status of every department in the entire factory; the system is so complete. The thing that interested me the most, however, was the fact that they have in their various departments, specialists whose business it is to carry on a searching examination and investigation every hour of the day and every day of the week for the purpose of ascertaining if the best processes are in use there at the present time. They carry on this examination to see if it might be possible to substitute some other materials in place of the materials they are now using, and to see if it might not be possible to put the materials that are in use through some different process in order to arrive at the same result with less work, with increased efficiency, and, of course, with greater profit, which is the end.

On that same trip, it was also my privilege to go through, what is probably the most modern flour mill in the United States; if not in the world. It is not the largest flour mill in the United States, it is one of the largest, but not the largest, but it is the most modern. Again, the thing that interested me most there, outside of the direct management of the mill, was the fact that these people have found that it pays them in dollars and cents to hire a specialist whose business it is every working day of the week to examine into the processes used in that mill. He carries out physical and chemical tests daily of the flour that is turned out there, what they call blended flour. It doesn't have quite the same meaning as when we use that term. The man who holds that position was for years an agricul-

tural chemist. This large milling concern has found that it pays them in dollars and cents as I stated a few minutes ago, to hire that man at a good-sized salary for the purpose of examining into the methods that they employ in that big mill, and the thought occurred to me as it has occurred to me many times since, that if these various lines of industry—and they are only small phases, you might say, of industry—could afford to hire specialists whose business it is to carry on a daily examination of that business, a daily critical self-examination, you might call it, because these men are employed by the business itself—if it pays them in dollars and cents to hire such men, it seems to me that the great business of farming can afford to carry on the same critical, self-examination.

In a group of people of this nature—it is not necessary for me to say anything about the importance of farming—we all know that every living person in this country depends upon the man who produces the food and the clothing for all of us—it is not necessary for me to emphasize that point whatever, but I do believe that it is worth while to say in passing, that this business is big enough, is fundamental enough, is of sufficient importance to all of the people of the United States as well as to the men themselves who are engaged in this business, to carry on a daily, critical self-examination of the business, and the only reason I make that comment is that here and there we still find someone who thinks they know all there is to be known about the business of farming just because we have had handed down to us customs and traditions from the past. I say the business of farming is big enough and complex enough to make it pay us in dollars and cents to carry on this same critical self-examination that has resulted in such great profit to the automobile industry. I could mention a hundred and one illustrations; I could point to the development of transportation which has been the result of critical, daily and hourly investigation into the methods that were in use for the purpose of finding better methods, finding better materials, for the purpose of bringing about increased efficiency, and the business of farming can stand, yea, it needs that same critical self-examination.

Now the agricultural leaders of half a century ago, yes of a hundred years ago, realized there was need of this critical examination. George Washington pointed out in his time that it was necessary for us to make a study of the soil. Benjamin Franklin pointed out the fact that you could produce more on an acre of ground that was properly cared for, fertilized, than you could on an acre that was not, so what we know about fertilizers is not altogether of recent origin. Thomas Jefferson pointed out the fact that many improvements could be made upon the plow. Some of his suggestions were taken up by practical men and put into operation, resulting in some definite improvements to the plow. The first agricultural society in this country was organized in Philadelphia in 1776, I think it was, and Benjamin Franklin and George Washington were both members of that agricultural society. Half a century ago, the agricultural leaders—and they were more numerous by that time, realized full well that there was a great need for more definite information about the scientific facts underlying the common farm practices with which everyone who lived on a farm in the open country was more or less familiar. What was the result? We had established

land grant colleges whose purpose it was to get, to secure some agricultural facts. Later we had the experiment stations. Later on, we had our national department of agriculture and the various state departments of agriculture. The point I want to make is this, the great problem half a century ago, was the problem of securing reliable information of a scientific nature concerning the process of farming.

Now the great problem before the agricultural leaders of today is not one of securing this agricultural information, although there are still many, many things that we do not know about farming, much as we do know, much as we have inherited from the past, there are still many facts yet to be learned and you and I will be dead and gone before some of the very simple facts—they may prove to be—will be common knowledge among the people of this State. But even though there is much to be learned, the great problem of today is not one of securing this information. The problem that the agricultural leader of today faces is this, it is the problem of taking that information which is available to the people who are on the job, if you will excuse the slang, carrying it from the various sources to the people who are doing the work and further than that, putting that information into operation.

It is one thing to get this information; it is another thing to take this information to the people who want it, and another thing to get that information put into operation; and the great task facing us today is this task of carrying this information to the people who want it. That is why we have federal aid for this work; that is why our National Department of Agriculture is carrying on all these demonstrations throughout the United States. That is why the State Department of Agriculture with its very efficient corps of instructors, is busily engaged in this very proposition because that is the job of the agricultural leaders of today. And right here in passing, I want to pay a tribute to the man who stands at the head of our State Department of Agriculture for the past few years and who has been developing that department of agriculture into a very efficient department. I say, long may this Department live and may its efficiency be further increased, and I also want to pay a tribute to the men who are engaged in this very business which I think, and I am not alone in this, is the business of the agricultural leaders of today, that is the business of taking the information from the various sources—and there is no one source—from the various sources, to the people who live in the open country and are endeavoring to put this information into practical operation, and you men who are members of this Department of Agriculture, engaged in this work, ought to take renewed faith in this cause in which you are working.

In passing, I merely want to say that I believe you are all engaged in what is today the big agricultural problems. There are problems that are to be solved right on the farm, that is true, but it has been pointed out to us time and again, that there is already enough information which, if put into operation, would save us millions of dollars every day. Our state colleges, experiment stations, the National Department of Agriculture, all these agencies have now a vast amount of available information, but the problem is to get it to the people who want it, and after you get it there, to get it into practical operation.

We are hearing a good bit these days about the problems of the country, and some people would have us think that the country has gone to the dogs, that the country church is practically no good, that the country schools are of practically no value, that the country home is no good, that the woman on the farm is a beast of burden, and nothing more, because some people have been carried away in their enthusiasm to extremes. Don't forget for one minute—and I know you won't because you men know the situation because of your vast experience—don't forget for one moment that the city has more problems than the man on the farm has ever had, and I want to say right here that I believe those who have anything to do with the working out of the problems connected with life in the open country are coming a little bit nearer to a realization of those problems than the people in the cities who have been wrestling with the city problems for the last half a century. They will always have their problems in the city, but they are over-shadowed sometimes, by the newer problems that come up. The only reason we are hearing about the problems of the country today is because this is newer to some people; the problems are not new by any means, but they are new to some people and get more space in the newspapers, but the same problems, the same disagreeable problems, some of them are, in the city, are still before the people of the city and I am not going to point out what they are, but let me mention one or two.

The question of housing, the question of good streets, the question of a sufficient and pure supply of water, the question of sewage, the question of the prevention and control of fires—right along that line you may know that Ex-chief Croker of New York City, who for years was head of the fire-fighting system, discovered there that in spite of the fact that they were spending more and more money in the city of New York every year for improved fire apparatus for increased efficiency in their fire-fighting department, that in spite of that fact, they were fighting a losing fight in the City of New York, that fires were increasing, that property damage as a result of fire was greater every year until Chief Croker came to the conclusion that they were not attacking the problem in the right manner and resigned as chief of the Fire Department of New York City and went into the fire prevention work, attacking the same problem from a different view. There is a problem that the city will always have, and there are a good many others. And I want you to consider the vice prevalent in the city; and they have their problems while the people in the country are having theirs, but I do believe that those who have anything to do with helping to solve some of the problems that are peculiar to life in the open country, are coming just a little bit nearer a better solution than some of the people who are engaged in attempting to solve the problems of the city. Perhaps it is hardly necessary in an audience of this nature to call attention to that fact at all.

I must confine myself, owing to the fact that there are several speakers on the program, to the particular subject assigned to me, yet what I have said has a bearing on what I say. The great problem of today, let me repeat, is this problem of getting this information from the various sources into the hands of the people and may I say here, that the work is so great that there is work for all hands to do. No one man, no one agency, no one group of men, can do all of this work. The work is so great that there is work

enough for all to do. My great hope is, and the thing that I endeavor to help as much as I can in my weak way is this; I believe when all the forces that are engaged in this proposition that we are discussing here to-night, or when all the forces now in existence or which may come into existence that are engaged in this proposition of carrying this message, this information from the various sources to the people, are working hand in hand and in close co-operation, the work is going to be done more efficiently than now, is going to be done more rapidly and with greater success, not only as far as the work is concerned, but as far as the co-operating agencies are concerned. I believe, my friends, that that is one of the great problems facing Pennsylvania today and I trust we will be able to see our way clear for every force to increase its efficiency without losing its identity, and I think a close co-operation will help to bring that about.

Now where does the public school figure in this agricultural development? I want to say here, in passing, that I do not believe that it is the function of the public school to participate in industrial movements for the improvement of agricultural conditions unless it can do it very largely through the rising generation, because there is its business. The business of the public school is to give the boy and girl, that comes into that school, the type of training that that boy and that girl ought to have. It is a question as to whether we have been giving the most efficient form of education. I say it is a question. I hardly think it is a question at the present time. I think we have come to the conclusion that our present system of education must be modified, not eradicated, not thrown away, but modified to some extent so that with the training of the head, we may give some practical training of the hand. I believe that every boy has a right to expect, when he enters the doors of the school room, that when he comes out of that school room, at the end of a term of years, he shall be better able to earn his daily bread and butter as a result of the education that he receives there in that school. The education that he receives should be an education *for* work instead of an education *away* from work. I sincerely pity the boy that grows up without any opportunity to work, without any chance to work. It has always been my conviction that every boy, regardless of where his home is or what he expects to do in the future, would be much better off if he could spend one to three years on a farm. Every city boy would be better off from the standpoint of his physical condition, his mental condition, stamina, and growth of all kinds and his outlook on life, if he could take three years of his life and go right out in the country and live on a farm, not board on a farm, not be a guest, not be a student on that farm, but be one of the young men who live there and work there and play there. I believe that every boy would be better off. I have been thankful many and many a time that it was my privilege as a boy to live on a farm, and get that very experience which I would not exchange for many dollars, regardless of the work I am in. Every lawyer would be a better lawyer, I believe, and every doctor would be a better doctor, if, during his boyhood days, he could live through some such experience as that.

Now, coming down to the direct question of the discussion of agricultural schools, as I shall have to jump into that now rather rapidly—there are in the United States to-day, three types of secondary schools of agriculture. In discussing agricultural education now, I shall say nothing about the agricultural colleges or higher agricultural education. There are three types of agricultural schools in this country, all doing about the same kind of work, dealing with the same type of boy.

In the first place, there is the congressional district agricultural school which, as its name signifies, is a congressional district school, that is to say, there is one school of this kind or type to each congressional district in the State. The schools of Georgia are examples of this type of education. It has been my pleasure to visit every one of this type in the United States, having visited every state east of the Mississippi, except three or four, for the purpose of visiting these schools and trying to get some measure of their efficiency. The congressional district school must, of necessity, inasmuch as it is intended to serve the entire congressional district, must have a rather large equipment, it must have dormitories to take care of the boys and girls who come from considerable distances. I have found in all the congressional district schools I have visited, that a large percentage of the boys and girls enrolled in that school come from the county in which the school is located; most of them even come from that section of the county in which the school is located. I found one school down in the State of Georgia that was located way up in a corner of the congressional district and about 65% of the students came from that county, most of them coming from the upper half of that county. There were one or two counties that had few or no representatives in that school at all. The school attempted to serve the whole congressional district. The school had a school farm and rather a large school plant.

The next type is the county agricultural school which is very similar to the congressional district school, in fact, I have found in some states, county agricultural schools that had a larger plant than some of the congressional district schools. They did not serve as large an area or as many students, in some cases, but had more money behind them to produce the schools. These county schools attempt to serve the whole county, but even in these county schools, it is necessary for boys and girls to come to school and board or board in town. That is true in Wisconsin where they have a number of these schools and it is true in Maryland where they have a few. It is necessary in such cases to have a school farm.

The third type is the agricultural department in an existing high school. It is the smallest type of the three; it is the type which is the nearest to the people of the three; it has the smallest equipment and takes the least amount of money to start it; but by the way, you cannot measure the efficiency of a school by the amount of money you put into it at all, though it is sometimes true, that if you put little or no money into a thing, you get few or no returns. You cannot expect in education, or anything else, to get something for nothing.

The advantage of this agricultural department in an existing high school, the advantages, I should say, are chiefly these: In the first place, the school is right at home; the boy and the girl can come into

school every morning and go back home every night, and it is my firm conviction that boys and girls of a high school age, should be at home every night during the high school period. They are needed at home, the mothers are in need of the girls of that age, and the fathers, the farmers, need the boys of that age, because they are a very great help mornings and nights, Saturdays and holidays, during the summer. And, furthermore, they need their homes very much at that period of life.

Now the agricultural department or agricultural high school, if you wish to call it so—this school is located so near the homes of these boys that it is not necessary to purchase and operate any school farm.

The main objection to having a school farm is this: That that school farm is very apt to be run under conditions that are not natural; they have to do certain things in order to fit the school conditions and the experience that the boy gets on a school farm does not always compare favorably with the experience that he would get on his own home farm, and the home project work which every boy carries on who is a member of the agricultural class in these agricultural high schools, the home project which he carries on can be carried on on his own home farm under the supervision of his father as well as of the teacher of agriculture of that school, and the school is so located, inasmuch as it serves a rather limited area, that the teacher of agriculture can get to the boy's home and supervise that project. I will tell you more about that later, when I throw these slides on the screen.

I think those advantages are advantages that are worth considering. I admit that this type of school is under a very close scrutiny and must stand a more severe test than your larger county school or your congressional district school. If you want to get a lot of advertising, create your special school serving a county or several counties, build several attractive buildings, buy a school farm, put up large buildings with dormitories and then take your pictures, as some of our Western states have done—the Western states know how to advertise and find that it pays to advertise in more lines than just in business—some of those states have credit for operating types of education that have been in operation in Pennsylvania and New York for the same period of time that they have been in operation in those Western states, yet the people of Pennsylvania and New York know nothing about it because we have not learned how to advertise. I believe that a certain amount of advertising in school work and church work and other lines is legitimate and even necessary. We can learn a great many lessons from California and other states that can produce apples, not as good as the apples grown in Pennsylvania, yet by their methods of growing and marketing and advertising, can send their product clear over to Philadelphia and New York and educate the public to want their apples in preference to those grown in Pennsylvania and New York. It has been my experience to find that the dealers in fruit there, particularly the retail dealers, will try to impress on you the fact that they are selling Western apples, not New York State apples, and not Pennsylvania State apples. They must have learned that the public is looking for Western apples, and it is because of the way those people advertise.

I believe it is about time that we Pennsylvanians took hold and boosted Pennsylvania. About the only thing we have been hearing about Pennsylvania is the graft of the State Capitol, and I am sick and tired of it. I have heard time and time again when visitors would come into that Capitol, the very first thing they would say to the guides who so efficiently serve them, "This is the building on which there was so much graft." They never see the beauty of the building at all. I say it is about time we took some pride in that magnificent Capitol, the best in the United States. I say it is about time we begin to boost Pennsylvania, in other ways, that we be boosters, not knockers in Pennsylvania, and I believe it is a part of my business because of the work I am in, and your business because of the work you are in, to help on this movement of boosting Pennsylvania. It will take a period of years to get the people of the State generally to boosting everything in the State. You may think it is an easy matter, but isn't it time we quit knocking each other? Isn't it time we started in to boost each other? It is not characteristic of Pennsylvania as of those Western states, particularly the Pacific Coast states, for everybody to take hold and boost everything in the state. You talk to anybody that lives in California, and in five minutes you will be convinced that the thing you ought to do is sell out and go to California. We have a good bit more reason for talking that way about Pennsylvania than they have about California, because if the truth were known about all sections of California, you might not want to go out there and live. There are some nice spots in California, but the state, as a whole, does not compare to Pennsylvania, and it is about time we did something. Pennsylvania has decided, as have New York and Massachusetts, Indiana and the State of Michigan, and the great State of Minnesota, which has thousands of dollars to put into education of this kind, that the most efficient form of secondary agricultural education is agricultural education of the high school type, that type which is typified by the high school department of agriculture or the agricultural high school in the agricultural community. It makes less of a showing, it takes longer to prove itself, but it is nearer to the people and it must stand the test.

One illustration: A boy carries on a home process, he carries on that on his own home farm. His father sees every day what that boy does, sees the methods that boy employs, learns what the supervisor of agriculture tells that boy when he comes to talk with him about that project. If there is any value in that project whatever from an educational or productive agricultural standpoint, that boy's father gets it also. If there is no value in it, that boy's father soon sees it and the whole business no longer receives that man's support. If that boy went to a county or congressional district agricultural school, he could carry on his work on that school farm and nobody would know what it was. It isn't under such close scrutiny, it doesn't have to stand the test. But let me re-iterate that the chief function of the public school, or agricultural high school in this development, is to give the boy or girl that comes into that school, the type of education, that he or she ought to have in the improvement of agricultural conditions. Some of it will come as a result of the instructions given in this

school, but primarily, it is to give the boy or girl the type of education he should have, and I think that school should give him some information about the business he is engaged in and which he probably will follow when he gets through with this school work.

This agricultural school work started in Pennsylvania two years ago with the passage of the Vocational Education Act. Five schools were started; this year we have twelve schools in operation in twelve different counties, and next year there will be many more in other counties. As I said a little bit ago, I believe it is time we all pitched in and co-operated with each other. My theory is this: That these agricultural high schools ought to be local centres for the various agencies that are carrying on their very efficient work, and I want to say right here, that all of these agricultural high schools stand ready to assist and co-operate in any and all of these movements for the improvement of agricultural conditions in the State of Pennsylvania. The agricultural high school movement is only one, is a small phase, not to minimize the work they are doing, at all, but it is only one phase of this great movement for better agricultural conditions in the State. It has its peculiar work to do, but we do believe while it is doing this work, it can work hand in hand with those who have some other phases of the work to do.

Now, without further comment, I want to throw on the screen a few slides showing some typical scenes in a few of our agricultural schools. You will notice as these pictures are thrown upon the screen, that the scenes, as they are presented, do not represent the ordinary school room. The atmosphere of the ordinary school room is not present in our agricultural school. The work is practical. Allow me to say here also, however, that in our enthusiasm, we do not allow ourselves to forget, as I stated twice this evening, that the chief business of this school is to give an education to the boy and the girl that comes to this school. Training for citizenship is not lost sight of, and half of the boy's time is spent in the study of practical subjects. The other half is spent in the study of academic subjects because the boy on the farm will always have as much need of English, and the same English training, by the way, as the boy who enters the factory or the shop or the bank or the store. This particular school happens to be located in a court house, there being no available space in the school house. But this is a high school located in one of the northern tier of counties of the State. There happened to be no room in this building for the agricultural department. The next building with the white columns, had a very large basement which was utilized for this purpose, a series of rooms being fitted up for the agricultural department. This, it happens, was not the slide supposed to be in that particular place. It happens to be a picture of the prize winners in the bread and cake contest in one of the high schools in the northern part of the State. It goes without saying that the study of soils is an important part of the work in these agricultural schools. The work of these schools consists partly of recitation work in the agricultural class room, or the laboratory, as it is called, consists of experiments in the laboratory and consists of field trips. The previous pictures showed a class in agriculture under the direction of the super-

visor of agriculture, sampling soils in the various fields surrounding the school. As a rule, most of the boys in these agricultural schools, ask the supervisor of agriculture to come to their home farms for the purpose of examining the soils on their farms. In many cases, soil maps of the farms are made.

This is a class in a small, but very up-to-date and progressive agricultural high school or agricultural department in a high school in Lancaster county. Even Lancaster county, with all its knowledge of agricultural conditions, with all its agricultural wealth, has found that it pays to take up this form of education. Here is a picture of that same school in Lancaster county. Two boys have been carrying on some experiments with soils and are making their weight measurements. Poultry raising is usually taught in the first year of the course, although a fixed course, or suggestive course has been offered for the agricultural schools of the State, yet the agricultural course is flexible enough to meet conditions in all sections of the State. Here is a class in one of the southwestern counties of the State, engaged in killing and dressing chickens for the market. That particular type of work is usually preceded by a study of it and the study of the various methods of killing and preparing chickens for the market. That is followed by a demonstration on the part of the teachers and the students themselves.

Here they are using the French killing knife and dry-picking the chickens. This is a poultry exhibit at Waterford, in Erie county. It was a small high school and a small department when it started out, but proved to be one of the most successful in the State. The boys made all the coops in which the fowls were exhibited with the exception of one. This is a study of corn, another crop which is very important. The boys are taught how to select a good ear of corn. They are also taught the various ways of carrying on the germination test. This represents a teacher of agriculture with his two boys, looking over the results of a germination test, and there they have used what is known as the rag-doll tester. You are all familiar with that. I shall not go into details at all. The slides show those of you who are engaged in the agricultural work of the State merely some idea of the methods employed in these schools for carrying on this work. This is a corn and potato exhibit. These were the prize winners in Jefferson county last fall. Each one of these boys won a free trip for their work in raising these potatoes and corn. This class is out hunting for borers. As I told you a few minutes ago, the work is partly done in the class room and some of it is done in the agricultural laboratory and much of it is done out in the field. The work is usually so arranged that the class spends half a day under the supervision of the agricultural instructor so that it is necessary in the best interests of this work for that class to go right out into the wood-lot for the purpose of studying forestry. The class can do so and it is not necessary for them to get back in thirty minutes or thirty-five minutes for an algebra or Latin lesson. Their academic work comes in the morning.

Every boy ought to be taught how to take care of tools and how to handle tools. This is taken care of in our agricultural schools. This is a view in one of the schools started the first year in what

was a worn-out, run-down, private academy, taken over as a vocational agricultural high school and started this year with an enrollment of between 60 and 70 students the first year. This very efficient and practical shop was made out of the basement by putting in more windows and concreting the floor. These are some of the things the boys make in the shop. I believe in manual training, the manual training that has been in operation in some of our schools during the past ten years has not fulfilled expectations. That is partly because of the type of work done there. It is true the boys are taught how to handle tools and how to take care of the tools, but some of the things which they make, and some of the things they do in order to learn, those processes are not in themselves practical. It is my theory that a boy can make something practical while he is learning to handle a saw or hammer or chisel. This work beneath there, that step-ladder, wheel-barrow and those crates, were made by boys the first year in the agricultural department.

This shows boys in one of our agricultural schools making a blue-print frame. They wanted to make a hot-bed, and they first drew their plans, then made a blue-print frame, then their blue-prints, then they started in the shop and prepared their lumber. They even made the sash, something which is not usually done, and glazed it. Of course, probably from a commercial standpoint, it does not pay to teach boys to make sash in the shop because carpenters as a rule, do not make their own sash; however, every boy ought to know how to do glazing. These boys later built the hot-bed. Most of those boys are Freshmen in that agricultural school. These boys are here learning something about shop work, about the handling of tools and are also engaged in the work of the poultry class. They are building this brooder house, partly on the time of the shop work, and partly during the time of the poultry class. Of course, all this work is preceded by the study of proper methods of housing the chickens.

That is a familiar sight to all of you. Of course, the use of the Babcock Milk Test—that is only one phase of the work in dairying done in these schools. I want to impress on you that it does not require any elaborate equipment to do this work successfully, because much of it must be done out of doors and right on the farm. However, I do not believe that any efficient system of education can be carried on by starting out every day to go and see what you can find, going out and hunting some cattle, and after you get there, judging the cattle. It must be preceded by some effort to organize your information and instruction.

This speaks for itself—it is a Wayne county scene, Bryson Springs, which must be preceded by some theoretical work. I am making no effort whatever to describe what is on the slides, because you can see at a glance. As I stated some time during the course of my talk, each boy who takes this agricultural course, which is a four years' course in the high school, must carry on some agricultural project. I shall show you here, slides illustrating two projects. Mr. Rockwell, the supervisor of agriculture in the agricultural department of the Mansfield High School,—one of our most progressive and successful agricultural departments in

the state,—will probably tell you about several as he has several different types of agricultural projects in operation in his agricultural department at the present time. This boy is preparing the ground for an acre of corn. He has taken as his agricultural project the raising of an acre of corn. What particular project the boy takes, depends upon his home conditions and it is an individual matter in every case. This boy decided that he would raise 1,500 tomato plants and he did that. He raised them and canned and marketed them. He bought himself two canning outfits before the season was over and he canned beans as well as the tomatoes. On the 15th of last June—and the reason I have the date is that every boy who carries on an agricultural project must keep a daily record of what he does in connection with that project, in order to have some record of the methods employed, and expense and labor and everything, everyone must keep this daily record—this boy kept his daily record and that is the reason I happen to know that it was on the 15th of June of last year when we had a frost and he covered 500 of his 1,500 tomato plants and the others he went out early in the morning and wet them in order to save them. He put his tomatoes on the market and the brand was known as the Waterford brand.

Now while we are providing practical education for the boys, we are also giving some attention to practical education for the girls, and there is a side of our education which we have not as yet developed very much. I am not going into that phase of it. That subject has probably been discussed by those of your own staff who are giving this matter serious and constant attention. While we know something about a balanced ration for a chicken and a hog and a steer and a cow, as yet we know very little about a balanced ration for a man or a woman or a boy or a girl, and it is infinitely more important that we know something about a balanced ration for ourselves than for the hog or the hen, and I believe that our education will be so modified that every girl will receive some instruction along this line. A reasonable amount of dressmaking, plain sewing first, some little fancy sewing in case some individual may desire it, but the real, every-day, practical sewing. Some mothers can and have, many mothers can and have taught their girls practical sewing, but there are still other things those same girls might learn under the direction of a capable seamstress. These are some things made by some Freshmen girls in the home-making department in one of our agricultural high schools. I believe that in the making of those things and in paying attention to the cost of the materials used, the girl has received as much culture as in a lesson in algebra and as much mental training. Basketry is taught in some of our agricultural high schools.

There are many things that can be introduced in these schools. Now if the process of carrying bricks from the ground up a ladder on to the scaffold of a building in the process of erection, after being scrutinized carefully, could be so revised that man's efficiency could be increased from 25% to 50%, it is barely probable that the simple processes of laundering, washing and ironing, might perhaps, with profit, stand some inspection. It is barely possible that some of the methods that our girls are familiar with, might be

modified to some extent after study. In any case, here is one thing we accomplish with all this work, regardless of whether any methods are changed or not, and some will be probably; here is a thing that is done and it is a thing that is necessary. Home-making is made popular with the girls, and do you know, my friends, I think it is about time that an effort is being made to make it more popular? It is all right for girls to study algebra, geometry, Latin, Greek and all those subjects, but if it is going to lead those girls away from home rather than toward the home, it seems to me that it is about time we give them some of this training with that other training.

Now I want to draw one distinction, that is this, and the reason I am going into details with you, ladies and gentlemen, is this: I feel that in the work you are in, you have a right to know exactly the methods we are following in the establishment and maintenance of these schools. Some of you have co-operated in the work of these schools already; meetings have been held in these schools; I want to draw this distinction for your information; sometimes a department of agriculture or of home-making, either or both, is established in connection with an existing high school, the school continuing as a high school with those vocational departments. Sometimes a special vocational school is started, which merely means that there must be in that school these two vocational courses. You may have a high school that has one vocational course, the agricultural, or one, the home-making. If you start a school that has both, you have what is known as a vocational school, what could be called, in truth, a vocational agricultural school; and I believe that is the type of school that is coming into the open country, because in that school, the subjects are properly balanced with relation to each other, the academic studies receiving the proper amount of attention and not too much.

This is a picture of an old academy that was on its last legs, just about dead, taken over as a vocational school and started this year for the first time as a vocational school with an enrollment of between 60 and 70 pupils. In that school were placed a faculty of 5 teachers, principal, academic teacher, and one teacher who devotes part of her time to the teaching of English and part to the teaching of drawing and music. The salary list of this school which is right in the country, a mile and a half from any railroad, runs about \$3,600 of which the state pays \$2,400. I claim that the country is just as much entitled to the services of qualified teachers, and experienced teachers, as the towns and cities are. And I claim that it is about time that the state put as much money into instruction in the rural districts as it does into the districts in the cities, and I also feel that not only the question of efficient teachers, but I believe it is about time that we let the cities and towns experiment with new teachers and we took the experienced teachers in the country. I think we are entitled to that. Three of these five teachers are college graduates, and the other two are graduates of normal schools. There is no reason why we should not have a school of this kind in every section of the State. That school is operated by four districts that went together for that purpose and I believe in many cases the township is not the ideal unit to operate

a school of that type. Three or four districts in the country should go together to operate a consolidated vocational or high school. Furthermore, there should be some special inducement on the part of the State for the formation and maintenance of such a school.

This was the agricultural laboratory in that school. Here are the girls in the Freshman class. Notice the fact that the girls of this school are more mature than the Freshmen of the average city schools. It means that better work is being done and more sensible work, you might say. One thing that the boys in the country—one opportunity that comes to them with the creation of a school of this type, among many others, is the opportunity for a chance to play with each other. These schools usually have their athletic teams of various types. This school had a basket-ball team, a baseball team, and a football team. I think it is a thing that ought not to be overlooked. I haven't time to go into that phase of it now. One other side to the work of this school—I believe the school, while its chief function is the serving of the boys and girls who come there, ought to have one other, which ought to be of some service to the entire community, it ought to have on file all the bulletins of the State Department of Agriculture, the United States Department of Agriculture, and our agricultural colleges and experiment stations, so that if any farmer wants to come and secure the use of these for one day or three days, he has a place to go and get them without any trouble or expense.

Night schools can be operated for all classes of people in the district. You notice the little girl in the front seat—she is there because her mother who sits immediately behind her had no one with whom to leave her and had to bring her with her. When she entered this school, she didn't have the ability to make a dress for the little girl. When she finished the course that winter in this evening school, she had made several dresses for the girl. Of course, that condition of a mother not knowing how to do plain sewing for a child, is not typical of the country districts. This is a picture of a farmers' night school. This is one other way in which these agricultural schools serve the people of the community. The farmers of the community are invited to come in once a week, if they care to, for the purpose of conducting what is sometimes called a farmers' night school. This farmers' night school is presided over a part of the time by the supervisor of agriculture, who takes up the topics the farmers themselves desire. On various occasions, various other agricultural leaders, members of the state department of agriculture in the vicinity, come in and conduct the work for an evening, members of the state college staff who happen to be in the vicinity, and prominent farmers take charge, some evenings, men of exceptional ability; in one or two instances, I have known the veterinarians of the district to come in and give instruction at these sessions.

Now what are we going to accomplish as far as the promoting or improvement of agricultural conditions is concerned? Is it going to be possible for us to grow sweet potatoes like that as a result of agricultural education in our public schools? Notice the size of those sweet potatoes. I have been growing sweet potatoes on a small scale for the last two years, but I don't guarantee that those particular sweet potatoes were grown in my garden, nor that those

strawberries came from my garden. We are going to do some big things according to some city enthusiast. Everybody takes hold of this great agricultural up-lift, as some of these city people like to call it. I suppose some of those persons think we really will be able to raise strawberries something like that and maybe cabbages of that size, but I will tell you what we will do through the work of these agricultural high schools, we will give boys of this type and this age, the kind of education they ought to have, and the kind of education, my friends, that they are entitled to, and that I believe it is our business to give them. Mr. Rockwell, who is to follow me, will give some details of the work of his own school. I have not gone into detail very much in connection with some of these things because of the fact that he will follow me. I thank you very much for your attention.

The CHAIRMAN: It is not on the printed program, but announced by the Director of Institutes this afternoon, Mr. Rockwell, the Supervisor of Agriculture in the Mansfield High School of Tioga county, will address you on the practical side of education.

ADDRESS OF PROF. ROCKWELL

Mr. Chairman, and Members of the Normal Institute: Will you pardon me at the outset if I should happen to use the pronoun "I" a few times in order to explain my position here? This morning when I first consented to be sandwiched in here this evening, I understood I was to talk to an audience of teachers; but I see in the foreground a body of note-worthy men—ladies and gentlemen—the greater part of whom are experienced lecturers and speakers, and it certainly is an embarrassing position for a man who never before has had any experience in public speaking. A little fellow came on the stage and with a trembling voice he uttered a little piece which was so appropriate to the occasion that I never can forget it. He said:

"Speaking pieces, speaking pieces,
What's the use, I'd like to know;
Getting up before so many,
When it scares a fellow so?"

This is my first appearance as a public speaker. I hope I do not make as big a blunder as when I first appeared before the Board of Examiners of the Normal School. Mr. Casey was conducting the examination in reading and asked for some definitions, and finally asked for someone to recite some poetry and make some proper gestures. The only possible thing I could think of, was "The Village Blacksmith." I rose and started and began like this:

"Under a spreading chestnut tree,
The village smithy stands;
The smith a mighty man is he
With large and sinewy hands."

Then unconsciously I said this:

"And the bristles on his brawny arms,
Strong as iron bands."

Knowing perhaps, Casey's humorous side of life, and how he enjoyed a joke on the other fellow, you can judge whether I passed in reading or not.

I will have to tell a story on a gentleman from his locality. He purchased a new span of mules and put them to drawing potatoes. He had loaded up a wagon and had to draw them up a hill to get them to the house, and he started along and was becoming so infatuated admiring his new span, that he had not noticed that the end board had fallen out and the potatoes had all rattled out. He got half way up the hill and his long-eared friends refused to go any further. He looked around and saw that the potatoes were all gone and a very disgusted expression came over his countenance as he uttered the words, "By Golly, stuck and nothing to unload." I can assure you that that is exactly the position of the speaker at this time. The good member of the Board who asked me to talk this evening, told me he didn't want me to say very much and I am sure he could not have picked a man who was more sure to fulfill those qualifications than the one he has at the present time.

It is my purpose to discuss with you for a very few minutes, the public school system in respect to its origin and purpose, its good qualities and its short-comings, some partial remedies and what we are doing and have done at Mansfield along the line of practical education. As probably the greater percentage of you know, the public school is not American in its origin, but has come to us from across the water and is principally of Dutch descent. It is about 155 years old. It was grafted on our national life at a time when ideas and conditions were vastly different than to-day. It was promoted with the purpose of universalizing education. The books were few and the colleges were few and were for the few. The college authorities saw this and conceived the idea that if they could import a sort of a free public method of education which would be classical in its tendencies, it would prepare students straight for college and increase the number of their students; so you see the public school system was promulgated with the end to treat every one alike, to achieve this particular purpose and prepare people for the colleges.

I heard Dr. Windship, of Boston, speak on the subject of public schools, etc., and he said that it was a rare occasion when we allowed our cattle to go for many months without giving them some change of feed and yet, he said, we have not changed the feed of our public schools in the last 25 years. This is somewhat far-fetched in its meaning, but, nevertheless, it opens an avenue of thought well worthy of our consideration. In discussing the proposal to build a new \$50,000,000 Union Railroad Station in Chicago, a certain editor came out in his paper and said he thought it would be very nice if we knew where our grandchildren wanted that station located. The second editor said that he thought we ought to go very slow with the public school and not have anything in it that our grandfathers would not sanction. I am convinced that we cannot build railroad stations for our grandchildren and schools for our grandfathers.

The State Department, as you have heard to-night, is advancing some new ideas along the line of education, and in every case are willing to back those up, yet there are lots of people who are not willing to accept those ideas just because their grandfathers and grandmothers all the way back to the ape, have always lived under those ideas and always will. Such people are dead from the chin

up and oppose all new ideas, and when one comes out in a newspaper, they want it stopped right away, and in nine cases out of ten, they owe for their subscriptions. When such a person dies, the editor has to print it under the head of "News," and is always glad that such a person has finally consented to be buried. This may be an old story to many of you, but it impresses very forcibly the large number of students who drift away from these schools at the age of 14 and 15. The last statistics I found, showed that out of every 100 people starting into the elementary schools, seven get to the high school, and out of every 100 getting to the high school, five get to college.

You will ask what becomes of that vast army that never get to college. They drop out into the so-called dark alleys of the world, become boot-blacks, newsboys, messenger boys, etc. This proves to me very decidedly that our public school system, that our system—of course, our system to-day is an improvement upon the system of the past, but it has not gotten away from it so far yet; it is educating about 10%; the other 90% are going away from school at the age of 15. I think I see a partial remedy to keep some of those people in school and that remedy is this, to give them a little molasses and not feed them sour kraut all the time. What I mean by molasses is inculcate something in the school system which will give the boy and girl an inkling of something they can do or some vocation they can take up in after life. Did you ever stop to ask a boy what he goes to school for? Have any of you ever tried out that proposition, especially with a boy that is 12 or 15 years old? Sometime, if you are ever in a school, you try out that proposition and it will amuse you greatly what the boy goes to school for. He has the idea that he has got to go to school until he is 16, then he is going out to get a job. I have tried out the proposition many times and it is the compulsory side they look at entirely.

The average boy going to school is like Pat and the rabbits. Pat came to this country all filled with curiosity and went down to a railroad station one day and saw a box with a wild rabbit that someone was shipping to a friend. His curiosity got the best of him. He went over to the box, looked at the address, lifted up the cover, reached down in the box, began to fumble around carefully, and all of a sudden out went the rabbit, over the railroad track and Pat after it. When he got on the hill, he saw the rabbit wriggling his tail at him in defiance, and he said, "You rascal, keep on, you don't know where you are going, the address is back there on the box." (Laughter.) The average boy going to school is like the rabbit, he don't know where he is going simply because there is nothing addressed to the life of that boy to make him look forward to some job or some vocation in life. I am talking about the boy, but I see ladies in the audience, and I don't want them to feel slighted. President Taft said that he thought if we taught the girl some trade, that the matrimonial proposition would be practically solved, and to sum it up in brief, he said, "When some weasel-eyed, skin-flint of a good-for-nothing came along and wanted to marry that girl, and she could earn her own living, she wouldn't have to put up with anything like that simply because she is afraid to be an old maid."

To turn to the other side of it, I have in mind two persons, we will call them John and Mary. John earned \$18 a week and Mary was the daughter of a good family. Her father was a man who earned a moderate salary, but had provided a good living for her, and in the meantime, Mary had become very extravagant in her ways; and, to make a long story short, John and Mary were married. When John went home to the first meal, Mary had made some biscuit. He sampled the biscuit, concluded he didn't like those biscuit very well, and about that time the cat came along, one of the biscuit fell off the table, hit the cat and that was the end of poor kitty. Next time he came home, he tried to choke down the beefsteak, and had to go to the saloon for something to eat. Things went from bad to worse and sooner or later, the matrimonial bark was wrecked on the rock of Mary's inefficiency. Mary was a high school graduate. She studied her Latin, her Cicero, geometry, algebra, had the whole outfit, but when John came home, he couldn't drink coffee made from the extract of 50 quadratics, we will say. He couldn't eat bread baked in the devil's coffin, he couldn't eat hash made of permutations and commutations of quadratics; he had to have something wholesome to eat. So you see Mary's education did not function when it came to keeping John's house. She had failed in the divine duty that she was supposed to do in life, making a good home. I think the nation depends upon the efficiency of the home to a certain extent. The mother, I am sure, is the largest factor in the American home. She is 90% of the American home. Doesn't it stand to reason that if Mary had not had quite so much geometry and algebra and Cicero and Virgil and all that stuff, and if in addition to that she had had something practical, don't you think it would have been better for Mary? Don't you think it would have been better for John? I think you see the point I want to make.

To illustrate another point, which is my last one, I wish to tell you a story of two sisters I have in mind that were left a farm. These two sisters were both college graduates, one of them was teaching for \$1,800 and the other for \$2,000 a year. They thought they would run that farm for a while and they went home; they engaged a neighbor to manage the farm by the name of Joseph. My, wasn't Joseph proud to be manager! He worked from morning until night, Sundays, holidays, most all the time, he was so proud to be manager of that farm. The girls after a while thought they would go out and visit the other farms and get some new ideas. They went out and saw that the other people were conducting the Babcock Milk Test. They went home and told Joseph. He did not want to do it but was finally compelled to do it. Later they saw the other people around the country were washing their hands before they milked and they told Joseph they wanted him to wash his hands before milking, and he said that he washed them once a day and that was enough; and sooner or later on account of Joseph's unprogressiveness, he was released from the position. In the meantime, he had married the kitchen girl, and the girls had built the two a nice little cottage and they were indeed very happy. That made it necessary to get another girl from the woods. She came from the back-woods, had never even seen a train of cars. Her language was very poor, her walk was bad, her dress was a

fright. She came there. Her stature was somewhat larger than that of the previous girl and she noticed that the girls talked differently from what she did and she began to eliminate from her vocabulary the things they didn't use. She soon surprised the girls by talking so well, after she had saved up enough money she went to the two sisters one day and asked if she could not go to the same dressmaker and milliner they did. They said "yes," so she went down and got a new tailor-made dress and the girls didn't know her at all. She looked so much better than they did that they were ashamed to walk with her on the street, and as Billy Sunday would say, as far as looks were concerned, "She had them trimmed to a frazzle." One day a real estate agent came out and Mary asked the girls if she couldn't go along. They said, "Yes," and she dressed up and got into the front seat, didn't make any bones of it at all, went out to the station where they were to look over the property and Mary became very much infatuated with it when she found it could be bought on the instalment plan and bought some of the real estate. To keep up with the hired girl, the sisters had to buy some, and next day the real estate agent came along and gave Mary a commission for what they had bought. Next day she started out and told them the possibilities there were in buying real estate on the instalment plan and it was not long before she told the girls she couldn't work for them but half a day, she had so much other work in selling real estate. About a month later she came around and told the girls that she couldn't work for them any longer because she had bought an auto, rented an office, and was a real estate agent. In three years Joseph was looking for a job. In three years Mary was a successful real estate agent.

I have a purpose in mind in telling you that story. The high school, or public school, if it is going to educate 90% of the people, or if it is going to give 90% of the people all of the education they will ever get, has some responsibility on its hands. You people are from all parts of Pennsylvania and are a very good representation from the State. No doubt, you are very influential in the places from which you come. Now are you going to be like Mary or are you going to be like Joseph in promoting this new idea, or promoting a school system which, if the boy cannot go to college when he gets through he will have something practical in life to work with? I will leave that for your own judgment. Mr. Dennis has shown you a number of slides. Some of the slides I expected to show you did not arrive so I only have a very few and it won't take me but an instant to show you these. This is a picture of the agricultural class of the Mansfield-Richmond High School. You notice there we have a very good representation. I will tell you how I managed to get such a large class the first year. When I went home from State College last Easter vacation, I went to the high school and gave them a talk on the benefits of a practical education. During the summer-time, I hired an automobile; I visited the whole territory in Richmond and Mansfield borough for students to take up agricultural work and I saw a number of students and talked the proposition over with them, especially the boys who I thought, would not be able to go on to college. The first day of school when the professor called for students who would like to take up the agricultural work, over half the boys in the school stood up and the professor was so surprised, that I could see he did not like it very well.

He is a gentleman who has never thought very much along vocational lines. It was such a surprise to him; I guess he thought the whole school was going to turn into the agricultural department, so he eliminated a number of those boys who stood up, who, he thought, were too young to take up the work.

I just want to mention in passing, this, that we had a track at Mansfield last Saturday at which Tioga and several other counties were represented, and the Mansfield High School won the events, took 42 points; their nearest competitors about 25. Of those 42 points, about one-half of them were taken by the boys who came in from the farms. This gentleman right here, won the silver medal for getting the most points of anyone in the five schools. He also won a gold medal for scoring the largest number of points of anyone in the high school. This gentleman right here, won the shot, putting it 38 feet and 10 inches. This gentleman here functioned in the broad jump. Another boy got second in the broad jump. Of the basket-ball team, six fellows of the seven belong to the agricultural department; of the baseball team, six of the nine. So it brings to the front, the country boys who are the strongest of all, and are developed along other lines as well as agriculture.

This is a picture of the shops. These boys here are making step-ladders. These hammers were donated by Maydo. He gave them two dozen. We received a dozen saws, some squares, bevel squares and a number of things like that were donations. Here are some of the things that were made in the shop. This was taken early in the year before we had very many made. We have step-ladders, saw-horses, nail boxes, crates, etc. These are taken around town and many are sold. In that way our shop is a sort of self-sustaining institution and we sell these things for just what they cost. This is what I call my over-flow work. There's always boys who get through in the shops before the others do so I bought some lumber myself and had the boys make a little colony house and we made it according to scientific principles and when they would get through their work, I'd let them work on this colony house. This is to take right down and take out-doors. Here is the forge-room. I have in this forge-room, about \$125 worth of equipment. It cost the school board about \$18 or \$20. The Bell people donated one of these forges and the Lancaster Forge Company, the other. The other equipment, anvils, drill press, taps and dies, and many other things—I bid those in from a sale in which the fellow had deserted his family and owed a rent bill and I got about \$80 worth of stuff for \$15, so you see we got the things for our forge-room at a very reasonable price. The things we make in here are rings, braces, chisels, hammers, horse-shoes, chains, etc., and in that way they get the welding and tempering and when they want something on the farm, they won't have to go to town and spend half a day to get it fixed.

In this project, they are preparing poultry for show, these are the different wash waters and here they are dry-picking a bird. This gentleman here lives at Hornell. He cannot be at Mansfield during the summer to carry on this project, but he is going to go on a big poultry farm there this summer with his uncle, so in order to say he had done some sort of project, I had let him hatch about 500 eggs and he has four machines to attend and he had good success with all but one machine which was a very old one and he is now running another machine in place of that. This is

a demonstration of a capon fowls. This year I expect to have the different boys raise on their own farm about 200. This gentleman right here has already 26 capon fowls that weigh about $2\frac{1}{2}$ pounds and he also has another bunch coming on that will be ready to caponize in the course of two weeks. I hope to have 200 marketed at Christmas time. I will market them for the boys, but they will raise them on their own farm.

Before I take up this picture, I will say a word about our work in poultry. About 12 or 14 of the boys are going to have projects in raising poultry. Two of the incubators were donated, one by M. M. Johnson and the other by the Buckeye Company. The boys will raise the chickens there on the farm. If they raise layers like the Leghorns, their problem will be, how much did it cost to raise Leghorns until they come to laying? If it is a meat breed, they will figure how much they make until they market their poultry.

This is a demonstration in pruning. I have three boys doing projects in orchard work. One boy has 57 trees, the other, in the neighborhood of 30. Their project will be to keep track of all the time and all the cost to take care of this orchard. They will make a map of the orchard, the kind of apples that grow on every tree, the number of marketable apples they get off each tree, then we will try to get a market for those apples. That is a project that will take some time during the summer. I have pictures of three boys doing work on the farm. This is another picture showing a demonstration in spraying. This is a picture of the night class. There are always some skeptics in communities when some new things come up. In order to show some of the people what we are doing, and whether it was practical or not, we devised this scheme through the suggestion of Mr. Dennis to have a night class for the farmers. The first thing we took up was the Babcock Milk Testing Machine for testing cream and skimmed milk. Before I pass this picture, this is our soils laboratory. We have polished tables that we use where they sit around when they recite. We have a very elaborate equipment for a school of the kind, and we are doing agronomy which they are doing at State College in the same manner as far as possible, as they are doing it down there. Some of the boys are so old that we can do that work this year and I hope to be able to get the credit for that work.

Another thing we took up in the night school was feed and feeding and plant foods in their chemical state, the lime question, and last of all we organized a milk testing association and we had 50 at the last meeting. Mr. Tompkins, of State College, was there and Mr. Dorsett was present, and had absolutely no trouble in organizing a milk testing association which, I think, is going to prove very successful for the community. I hope I have not imposed upon your patience and I want to close with a thought from Garfield who, I think, paid the greatest tribute to agriculture in the fewest words of any man I know of when he said, that ahead of all sciences, ahead of all arts, ahead of all civilization and progress, stands, not militarism, the science that kills, not commerce, the art which accumulates wealth, but agriculture, the mother of industry, and the maintainer of human life.

The CHAIRMAN: The next topic is "Centralization of Public Schools" by Mr. E. B. Dorsett, Mansfield, Pa.

Mr. Dorsett then read the following paper:

CENTRALIZATION OF PUBLIC SCHOOLS

By E. B. DORSETT, *Mansfield, Pa.*

Whenever a public writer or speaker is at loss for a subject upon which to express his views, he either selects the "Public School" or the "High Cost of Living;" little realizing how closely the two subjects are related. Few, indeed, are the number who have studied the close relation that one bears the other, but have felt that the most serious condition of country life, as we find it to-day, is the silent but startling migration of our rural people to the towns and cities. Country people are moving in to secure better school advantages for their children, which they are unable to get in many of our public schools. This reduces the number of producers and increases the number of consumers, thereby raising the cost of living. This pernicious practice is not only draining our farm homes of their brightest boys and girls, but is removing from the farms men and women in the prime of life, who are most needed to maintain a rural citizenship.

The type of citizenship in any community should be of such a character as will instill in the minds of its people a desire to build up and maintain better social and educational facilities. There can be little incentive to do this if these facilities are to be found only in our towns and cities. The fundamental problem of country life is that of keeping a standard people upon our farms, and in making life on the farm more attractive and remunerative. This can only be done by providing efficient schools, such as will meet the needs and supply the wants of our boys and girls. Years ago the rural school was the center of attraction. Singing schools, spelling schools and literary societies made it the life of the neighborhood. The school system then fitted the needs of the rural people. To-day, owing to industrial and educational changes, the old public school of the past has gone never to return again. We must have a re-directed school system and it must be directed in part, at least, by those whom it is to serve. All mankind, and especially the farmers, should be deeply concerned in this readjustment of the rural school.

THE FARMERS' VIEWPOINT

The administration of our schools and the burden of raising the taxes, rests largely upon the tillers of the soil. It is my purpose then to give you the farmers' viewpoint of the farmers' school. The making of the courses of study, the manner in which they shall be imparted to our children, the framing of the laws governing our schools, is almost invariably turned over to the professional educator, or politician, who, however excellent may be their motives, have limitations the same as the rest of us, and see only one side of the question, and that is the professional one.

Extending back to the days of Horace Mann, the father of our educational system, our schools have been built upon the beautiful theory that every American child shall have a college education.

This sounds well from the platform, reads well from the printed page, but never has and never will work out in actual practice. Building upon this theory, we have correlated our educational system. We began at the top instead of the bottom of the ladder. Between the Public School and the College, there is a broad and deep chasm; so high and so wide, that only about five per centum of our boys and girls ever cross it. We owe much to the pedagog of old New England for the impractical and inefficient school system under which we have been working for a half a century. It is time that the farmers should have something to say about who shall teach and what shall be taught their boys and girls.

CENTRALIZATION OR CONSOLIDATION

In an Act of 1901, the word "Centralization" is defined as follows: "That for the purpose of this Act, the word 'Centralization' is hereby defined as a system of schools in a township providing for the abolishment of all sub-districts and the conveyance of pupils to one or more central schools."

When the Pennsylvania School Code was enacted in 1911, all the previous legislation referring to consolidation, transportation and centralization was repealed and in its place the following sections referring to the subject of consolidation were enacted.

"The Board of School Directors of any school district in this Commonwealth may, on account of the small number of pupils in attendance, or the condition of the then existing school building, or for the purpose of better gradation and classification, or for economical or other reasons, may close and consolidate any one or more of the public schools in its district, and, upon such school or schools being closed, the pupils who belong to the same shall be assigned to other schools: Provided, That in any district of the fourth class, pupils who belong to any such closed school, and reside one and one-half miles or more from the school to which they are assigned, shall be furnished proper transportation at the expense of the district, to and from the school to which they are assigned."

It would thus seem that under the School Code, "Consolidation" rather than "Centralization" is the term to be used.

EDUCATION DEFINED

"Education is a reconstruction of our experiences." This is a short, concise yet comprehensive definition. Much of the subject matter that is taught in our public schools to-day has no relationship whatever with the experiences of the boys and girls on the farm. Hence, much of the teaching is meaningless and worthless to them. Culture is the object sought in obtaining an education. Not so many years ago it was quite generally believed that this could only be obtained by studying dead languages and higher mathematics. To-day we know that culture can be obtained just as readily by studying the things which are practical as in studying those which are not. The question of how and where they shall get their culture of training, is of but little moment, so long as they get it.

RURAL CHILDREN NEGLECTED

The most pressing problem of the public school and especially the rural school, is the problem of giving every child in rural communities a good common school education. To do this, it becomes necessary to first get them into our schools and then hold them there long enough to secure the necessary training. As the burden of maintaining our public schools rests most heavily upon the farmer, and as his children are the ones most directly benefited, it is time that he took a more active interest in perfecting a practical and intelligent school system. To provide every child of school age in his community with a good school and to keep that school in operation eight or nine months out of the year, requires a vast expenditure of money, as good schools cannot be had without some sacrifice. The rural school of to-day, as compared with that of a generation ago, is much less efficient in the training of our boys and girls. Then these schools were attended by large numbers of boys and girls who remained in them until they were full grown men and women. They were taught by the brightest minds in the community, often, during the winter, by college students and during the summer by women from the Normal school or academy.

THE SCHOOL OF TODAY

The rural school of today is taught, in most cases, by young, inexperienced, half-trained and often inefficient teachers, who lack in professional ideals and ambitions. They may be divided into three general classes: The raw apprentice class who expect to teach until a better position is offered them in the town or city; the marriageable class who teach until they get married, and the old stagers who are too inefficient to get positions elsewhere. Again, many of the teachers are from the town or city and are not in sympathy with farm life and know nothing of the real needs of the children. When Friday night comes they go back to their homes and do not return until Monday morning. Such a teacher can be of but little use in the school room and should never be elected to a position in a rural school.

SCHOOLS TOO SMALL

The attendance in many of our rural schools is so small that the teacher cannot do good work. Thus it has come about that many of our schools have too few pupils to stimulate the teacher to do his best work or to give the pupils that very important part of his education which comes from contact with his fellows. This condition is greatly aggravated when there are not pupils enough in the class for mind to come in contact with mind in the daily recitation or on the playground. While it cannot be claimed that consolidation offers a panacea for all the ills of the rural school, because there are many sections of our State where it would be exceedingly difficult, if not impossible, yet the movement thus far has been very satisfactory and is changing our whole school system. Undoubtedly the work will be extended and will become an important factor in solving the problem of the rural school. It adds another agency for breaking down the barriers of isolation and stagnation which so often have kept the farmer out of harmony with the world in which he lives, and which have caused the farmers' children to leave the country for the greater attractions and greater uncertainties of the city.

CONSOLIDATION MEANS BETTER ORGANIZATION

With consolidation of the rural schools will come very much wider opportunities for the enrichment of the courses of study by the introduction of those subjects which are most directly related to the improvement of agriculture and to the inculcation of a love of country life in the boys and girls on our farms. All around our rural schools lies a wealth of material, which, thus far, has been almost entirely neglected for the lack of knowledge and the absence of the skilled teacher. In the modern consolidated school will be found teachers of experience, well equipped and properly trained to organize the work entrusted to their keeping and correlate theory with practice.

Mankind in general, and teachers in particular, are indebted to science for the knowledge which enables them to point out the real relation which exists between certain facts and phenomena and the daily pursuits of man. In recent years much information has been gained in the study of those things in nature with which the farmer has to deal. The teacher is now able to unlock the secrets of the air, plant, soil and the animal and make them the common property of the child. The teacher, as never before, is now in a position to explain the activities of the natural world and of the advantages that may be taken of these activities. The nature of the soil as related to the crop which will grow in it, the life of the plant as related to the amount of grain, or forage, or fruit it will bear, the body of the animal as related to the food which it requires for maintenance or growth, the life history of injurious insects as related to the means for their repression. These are some of the things which the teacher, through the aid of science, has now to offer the boys and girls who intend to remain on the farm.

BENEFITS DERIVED

Consolidation of schools will have a tendency to unite the farmers who pay the taxes and support the schools, the home makers, the teachers, and the pupils into a co-operative organization for the betterment of rural education. It will instill in the minds of the boys and girls higher ideals of citizenship. The school will become a character builder, and the districts will be rid of those agencies which destroy character, namely, unkept school yards, foul and unsightly outhouses, poorly equipped and illy planned school houses, young, inexperienced and too often inefficient teachers. It will give a broader and more practical school course and in short better equip the boys and girls to fight life's battles.

CONSOLIDATION MEANS PROGRESS

It was not so many years ago that one dared to criticize the public school. To do so was considered an act of treason. The little red schoolhouse was both idealized and idolized. It was the backbone of our civilization and an index of progress. In recent years the one-room schoolhouse has become the target, not only of the critic outside of the school, but also of those who are directly associated and most vitally interested in our public school system. Sentiment in rural districts is rapidly crystalizing in favor of consolidation. Instead of conducting a dozen district schools in a

more or less efficient manner, with a given number of buildings to heat, equip and keep in repair, the children are carried to one central point where they are given the advantages of a graded, or better still, a high school of first grade.

This method of dealing with the rural school problem is becoming more and more popular where it has been tried out. It marks the beginning of a new school system, one that will be both cultural and practical. It ushers in what will some day be known as the Agricultural Age. It will put the boys and girls in rural districts in touch with an educational system that will be continuous; one that will best fit them for the work they are to take up when they leave school. This is something that has not been in the schools of the past and is not being done in many of the schools of to-day. In fact, there is no correlation between the work that is being done in many a school room and that which is to be done by the boys and girls after they leave the school. With the advent of the consolidated school, all this is changed, and we find the boys and girls actually studying the problems that will confront them when the dreams of youth have passed and life becomes a reality.

CONCLUSION

Betts and Hall's "Better Rural Schools," says: "Great movements and deep-seated reforms never come by chance. They are always produced by adequate causes, by forces that are consciously set in motion and carefully administered. There is still a great amount of social inertia to overcome and of ignorance and selfishness to be removed, before rural education comes fully into its own. Indifference to educational needs and advantages is still the rule in many communities. Prejudice yet obtains in hundreds of districts not only against the consolidation of schools, but against all improvements.

"These conditions must be wisely and courageously met. They cannot be overcome by fine theories nor by the appointment of educational commissions. The passing of wise laws and the adoption of helpful resolutions may be a step in the right direction, but without the winning of the people most concerned all these things will prove futile and fruitless. The reform now being sought in rural education will require hand-to-hand work, and almost a house-to-house canvass, to instruct, inform, convince and convert. A doubter must be persuaded here and a skeptic won over there; a stingy man must be stirred into seeing greater value in his children and their future than in his stocks and his farm; here an obstacle will need to be removed from the way of progress, and again enthusiasm will have to be created and maintained; movements already started must be cherished; projects that advance but slowly must be hastened; steps taken in wrong directions must be checked, and every phase of the situation watched with the greatest wisdom and care."

A Member: Mr. Chairman, I would like to ask Mr. Dorsett a question. Mr. Dorsett, how did you proceed to get your Mansfield schools consolidated?

MR. DORSETT: It was a very simple proposition.

A Member: Our Superintendent is suggesting something of the kind in Northumberland county, and the boys there want me to get some information from you if I can.

MR. DORSETT: In the first place, we had a joint meeting and agreed on what we should do. We had a contract drawn up in such a way that we each pay into the joint fund or to the joint treasurer, as it were, an equal sum each month. At the close of the term, we ascertain how much it has cost us per pupil, then each pays in a pro rata share. Now that is one way you can work it out. Another way is, if your school is established in the town, the township may send the boys and girls there and under the law they are obliged to pay you what it costs per pupil for that instruction. It is not a hard problem; there are many ways by which you can solve it. If you have to erect a new building, you may join jointly in that; you can have a joint board or pay per pupil as you desire.

A Member: Mr. Chairman, may I ask one more question: What is going to prevent the election of young, inexperienced teachers in the consolidated school?

MR. DORSETT: If you have a high school, the law will help you to determine that question, because teachers must have certain training.

A Member: It doesn't now.

MR. DORSETT: It does with us. You will hardly find a young teacher with the qualifications required in a high school.

A Member: Oh, not a high school, but in the grades.

MR. DORSETT: In the lower grades perhaps it would not cure that defect.

The CHAIRMAN: The next subject is "The Country Church; its Relation to Agriculture," by Rev. B. Monroe Posten, Pottstown, Pa.

Dr. Posten then delivered the following address:

THE COUNTRY CHURCH

By REV. B. MONROE POSTEN, *Pottstown, Pa.*

I have been pastor for twenty-two years in the country and am not looking at this problem from a ten-story window in the city. I have purposely worked in a number of sections of both New York State and Pennsylvania. I wanted to find out conditions for myself. I have found some interesting facts, but mighty little help in solving the problem. After I had seen what had been done with some of the timbers raised in my little churches, for instance, the pastor of one of the largest churches outside New York City, the Superintendent of City Missions, one of the leading physicians of Buffalo, pastor of a large church in New Jersey, principal of one of New Jersey's best schools, all were from my churches, I dedicated my life to the country church. I felt if I could only win one such as either of these, my work would not have been in vain.

That the country church is in danger is not a false alarm. It is true. Reports of investigations show fully 65% are dying or are already dead. A great many of these were so situated it were better if they never had been. Sixty per cent. of our great population live in the country, with 6,361,502 farms, valued at forty one million dollars. But it is estimated that in 1950 we will have two hundred million people, of which perhaps one hundred twenty million will live in the country.

What about the feeding of this great flock?

No one doubts that the farm is the basis of all industry, but it is more than that. It furnishes a large per cent. of the best men for all purposes. In Chicago, twelve of her greatest preachers, 75 of her leading machinists, 80 greatest lawyers were raised in the country. The Scriptures furnish an abundant record: Moses with his rod; Shamgar with his ox-goad; David with his sling; Gideon, &c., suffice. In Boston 87% of salaried men were raised in the country while 80% of pauper labor were raised in the city. Of 5,000 delegates to a world-wide alliance, 85% of this cream of a great denomination were raised in the country.

It is easy to collect figures to show failure of crops and stock, but who will say figures can tell the truth about moral failures? For instance, in our own State it cost \$200,000 to take care of the criminals of just one family in just a few years. Suppose this family had been producers of good stock of men and women, figures would be powerless to show the benefit as they are now to show the loss.

The church must make it possible to produce men of the type of Washington and Lincoln. As long as the helmet of salvation is lacking, little Davids can slay giants as it exposes the target for pebbles. We need men to-day whose presence will inspire as much as the addition of 1,000 men. It takes more manhood in bloodless battle than in open warfare. If the prediction that in ten years all farms will be in the hands of scientific farmers trained for a better agriculture come true, does it not go with the saying, it will make a mighty difference in the kind of characters they possess? A successful farmer must include the HOME as well as crops and stocks. It is just as humanitarian to raise good crops as to send a gift to the sufferers across the water; more so. The farmer must be taught that as he increases the nutritive value of his crop he increases the health of his nation. The church must present the Divine claims upon him as well as the claim of his fellows. Give me men and I can make their own atmosphere and environment. The gravest danger to-day is secularism. No work is secular that is worth doing at all. We must hold to moral standards and methods of helpfulness.

If we had Christian ideals in the Old World we would have no such war.

We must put the Divine into all human relations. Great leaders in agriculture as well as education look for and need the sympathy of the church. They ought to have it. The top notch soil and highest grade school need the engine which the church should furnish. Ford car assembled in 30 minutes was run 7 miles, then it stopped when upon examination it was found it had no engine it

was easy explained however it run on its merit. The church and farmers' institutes could work wonders, the church for inspiration, the institute with plans.

To-day is a crisis in the whole worlds' history. See the great discontent and want of confidence. You cannot stop it by driving it beneath the surface. To me this is the biggest asset to the whole thing. If the farmers, as a class, were not included in this discontent, there would be room for doubt. His discontent shows a door of opportunity.

Opportunity has chin whiskers and is bald headed. Catch it as it come or be forever too late. The blind staggering multitude want a guide. No living on memories of past achievements, or glorying in ecclesiastical respectability with half dead membership can solve the problem we are looking at. The church that will win must be larger than denominationalism. If denominationalism should die to-day we could solve the problem to-morrow.

No church will ever raise any higher than the expectations of its pastor, and no pastor's expectations any higher than the school to which he owes his life. We need more than anything a new rural leadership. The country church is forsaken by the ministry. That is, they go there to get a start, using it only as a stepping-stone. This is most unworthy of any man.

The country church has been killed by the disinterestedness of the cloth. The heads of the denominations are not without blame. Sending pigmies to do giant's tasks without even the skill to use the sling. You can not save the souls of a farming community without you take account of the body and mind of his family and make much of a job of it. Under some conditions I have found lots of them without much of a soul to save.

Wherever there has been a real successful country life, religion has had a very prominent part in making it so. We have given the farmer new machinery, new methods, then we thought he was free. Like the freedom of the slaves, we forgot we did not change the shape of their head and expected too much of them.

We must give the farmer a new relationship to his calling. The more science you give a man without leveling it up with grace, the weaker the man or men. The country church must minister to every home and help every individual in this territory or it has not done its work.

Show me the church and I will tell you the country condition. The church must teach co-operation by deeds. The home, the church and the school must pull together, then we have a real farmers' union. When all parts hold a right relationship to each other then we can have an ideal community.

Every man must devote himself to the betterment of the whole community. We need a new social consciousness while we are figuring for better prices for our crops and stock. The greater part of the migration to towns by the farmers has come from a failure to see his own responsibility to the community. The farmer is a real necessity and must be made to carry this responsibility. A sick hen will have plenty of night visitors, every louse and mite will call at night; poor soil invites all the vile weeds, so the sickly church in the country has invited all the disorders that are attendant upon disease.

The country church must teach that "get-rich-quick" schemes are from low desire. Godliness with contentment is great gain. That would half solve the boy problem. A boot-black, shining a cripple's shoes refused additional charges for double work required, saying: "I don't want to make money off other peoples misfortunes." He had the right spirit.

There is no place where the spiritual life is susceptible of as high attainment as in the country. Every truth has a double meaning here. The farmer will always listen to a man with a message to him. But it must be to *him*. Dr. Philips, first talked about horses, then cows, then school, each time showing ignorance. One day he spoke of siloes and he was invited into an intimate relation to that home.

My own observation is that the farmer's son is worth two city chaps under same conditions. This ought to appeal to the ministry. We hear once in a while that farmers won't get together or get together so far apart. That comes from trying to hold together from the outside. The church is the only institution that can work on the inside, therefore it has a great responsibility. The Lord's Prayer is the expression of a Divine co-operative commonwealth upon its knees. It asks for everything else before it asks for bread. Until the country church can pray this prayer truly, its power will be only over a few people but when it sees the whole community before it seeks selfish satisfactions, it will save the community.

I have met with churches that were too holy to hold institutes in; maybe they were good, but good-for-nothing. The church has been so intently interested in staying beside the cemetery that they are competitors for greatest degree of lifelessness. I saw a sign the other day. "*If it is not electric it is not modern,*" so a church today must electrify the life of the farmer. It is a crime to waste the Lord's money in trying to do his work in the country without trained men whose work does not overlap.

We must develop a family religion. What made the lack of reverence in the country when the family altar fell down, irreverence like all weed seed, grew in its place. Anything forced upon the farmer from the outside does him little good; for instance some good salesman sells him a piano with no one to play it. He teaches a child music, then he has a real use for it.

The best book on agriculture is the Bible. The biggest job to-day is the country minister. The country church is not a failure because it has not been tried. We need to hitch our work to a star of hope. We sing, "We walk with the King;" we need to work with the King as farmers. Some inspiration in that. The successful farmer must be his own greatest competitor. Nothing to beat another, but great honor to beat his best effort. Dan Patch, when he clipped another second off his own record, counted.

The evil influences of the hired man is another thing the church must take up. A large per cent. of them are not fit companions for the farmer's son.

Whatever affects humanity effects the church. Too many people think the church has no business in some matters. Of course she must not be simply meddlesome, but be possessed of the spirit of the Master. She must not only save the top soil of humanity, but

the subsoil. We need no adulteration of or diluted Christianity. When the country church stands for the highest standards, for loftiest aims and noble purposes and greater unselfishness, then it will do much for the farmer and as much towards a larger rural population.

Knitting men together without love is a farce. All involuntary combinations is dangerous. It is like the apple that appears to be ripe and you find a worm is the cause of its changed color. Men are sometimes organized because of circumstances, these always fail. Nothing but love of the cause and love of each other can make a farmer's organization that will be worth the name. The men who have killed the country church are those who have made it a comparative organization. It is one that is different and must always be. No right to compare it to a lodge or union or club. All are useful.

SOME OF MY PLANS

I keep a close watch upon possible removals or sales of property near enough to my church to effect it, then look for customers whose coming to us will raise the standard. In this I have had some success.

I keep in touch with every farmer, his stock, are all part of my concern. Have only this last year attended to hundreds of cases of diseased poultry always without charge. I allow nothing he has to do or contend with to be foreign to me. I have found a month's work in farmers' institutes of more benefit to me than all my other training combined. I have heard him ask a lot of questions and heard them well answered. I read more farm papers than religious publications. We are having school for learners in plain sewing as well as embroidery and art work each Saturday afternoon, that is helpful.

We have children's play day Saturday afternoon when we try to learn the art of playing fair with each other. One failure with the country folk is that they have had little play together to learn co-operation.

I am now planning a campaign to install 150 bath tubs in my circuit. One of the physicians said, "Put me down for No. 1; that's real religion."

What is education for? To make men good citizens, not to make them better men than those who are less fortunate, but to make them able to help those who are not so well educated. The Lord's Prayer is nothing but a Divine co-operative commonwealth on its knees. There is not a selfish petition in it.

Our Father which art in Heaven, child speaks;
Hallowed be thy name, worshipper speaks to his God;
Thy Kingdom come, citizen speaks to the King;
Thy will be done, servant to his Master;
Give us this day our daily bread, beggar speaks to the philanthropist;

Forgive us our trespasses, sinner speaks to his Saviour;
Lead us not into temptation, pilgrim appeals to a guide.
Deliver us from evil, captive cries to a deliverer.

Prays for all the world before he prays for his own daily bread.
Gives up his own will before he asks for a selfish thing, then he asks bread so he may be able to do something for others.

Do you know that the soul that tries to carry its own burdens alone soon becomes like the Dead Sea. No birds come and no grass can grow anywhere around. Do you know there is no way to world conquest that is not through Gethsemane and Calvary of self-interests.

The church has done lots in the past 50 years; hospitals, insane asylums, reading-rooms. But it needs to go a step farther and make these institutions free from occupants. We need to help misery, but better, make conditions so misery cannot live.

The good Samaritan was all right, but I would a good bit rather a man had arisen who made the good Samaritan unnecessary.

DIRECTOR MARTIN: Now, my friends, before we adjourn I have an announcement or two to make. It is our custom at each annual meeting to have a Committee on Resolutions. I believe there has been one death since we met a year ago. And other questions may probably come up for consideration, and hence I will announce as this Resolution Committee, Mr. B. F. Killam of Pike, Mr. S. C. George, of Indiana, Mr. W. F. Biddle, of Bedford, Mr. J. E. Hildebrant, of Luzerne, Mr. Lighty, of Adams, Mr. Patton, of Armstrong and Mr. Phillips, of Clarion. Any one knowing of other deaths or such occurrences as are proper for the consideration of this Committee, will please inform them of the fact.

Now I want to call your attention, just for a moment, to some features of our program to-morrow and of one or two subsequent programs. To-morrow morning's session will begin at 9 A. M. Mr. William A. Crawford, of Cooperstown, will be Chairman. The program is "A Definite Program in Breeding for Egg Production," which will be presented by so able a gentleman as Prof. James E. Rice, in charge of Poultry Husbandry, Cornell University, and will be illustrated by interesting lantern slides. Also our splendid poultry expert, Mr. W. Theo. Wittman, will present the subject, "Forty Popular Varieties of Poultry," also illustrated. Now, lest some of you may forget, I desire to mention to-night a feature of the program for Thursday night, which will be partially a song service by Mrs. Morgan of New York. I hope that none will miss that meeting and listen to "The Songs That Never Die." It will be a beautiful service, one in which we will all be interested and by which we will be instructed. Other features of the program we shall speak of later on. Please be prompt to-morrow morning at nine o'clock.

The meeting then adjourned.

Exposition Park, May 26, 1915, 9 A. M.

Director Martin in the Chair:—

DIRECTOR MARTIN: We have with us representatives of a number of the agricultural press. We have been honored by a representative of "The Ohio Farmer," and until the lights are properly adjusted, I know you will be interested in meeting the representative, Mr. Yocum, and listen to a few remarks.

MR. YOCUM: This is certainly an unexpected pleasure for me. I have only a few words. I want to say that I appreciate the opportunity of meeting this body of men, the men who have been so influential in advancing the Institute work of Pennsylvania. I certainly appreciate the opportunity of meeting every one of you.

DIRECTOR MARTIN: Is our friend, Mr. E. S. Bayard, of the "National Stockman," in the audience? He was here, I believe, yesterday evening for a time. Well, probably we may hear from Mr. Bayard a little later. Is the representative of the "Pennsylvania Farmer" here? I am not certain that I met a representative of that paper. While we are waiting a few minutes for the adjustment of the lights, I will say to the audience that there is a package of various bulletins of the Department of Agriculture brought here for distribution. Persons desiring to avail themselves of those bulletins will please just help themselves at any time.

Mr. W. A. Crawford takes the Chair.

The **CHAIRMAN:** The meeting will come to order. We will now proceed with the program in regular order, and the first speaker will be Prof. James E. Rice, in charge of Poultry Husbandry, Cornell University, Ithaca, N. Y., whose subject is, "A Definite Program in Breeding for Egg Production." I take pleasure in introducing Prof. Rice.

The address of Prof. Rice is as follows:

A DEFINITE PROGRAM IN BREEDING FOR EGG PRODUCTION

PROF. JAMES E. RICE, *In Charge of Poultry Husbandry, Cornell University,
Ithaca, N. Y.*

Mr. Chairman, Dr. Martin and Friends: I think this is the third or the fourth time that I have had the privilege of meeting with this Board, and I assure you that I appreciate the honor and the opportunity. Pennsylvania is a great State; it has made a great history for itself, not only in agriculture but in its Institute work. I feel that coming here more or less as a specialist in Poultry Husbandry, that I am talking to persons who, perhaps, may give respectful attention, but whose business primarily is in some other branch of agriculture. If I speak more as a specialist, talking to persons who are directly interested in keeping poultry or in teaching poultry husbandry in Farmers' Institutes, you will know that I do it thoroughly understanding the situation and appealing to your consideration to listen as patiently as possible if you think the subject is being dealt with more technically than it ordinarily would be handled with farmers.

We are making wonderful strides in our knowledge of poultry husbandry. Unquestionably there is vastly more, however, to be known than we know at the present time. We must look to the practical solution of these problems that confront us, and some of them are exceedingly difficult and serious through a combination of

forces. We need to have the scientific investigator at the expense of the State or the National government, trying out some of the things that are too expensive for the individual poultry man to do for himself, and we need the practical poultry man to put these things to the test. After all, it is the person who, on the farm, is caring for the hens, that is most likely to have the correct perspective of things, because he tries these things out in the crucible of every-day experience and he puts them to a dollar and cent test. Any scientific, or so-called scientific theory of inheritance, of breeding or nutrition or of poultry house construction or of incubating or rearing that cannot stand the test of the practical poultry man's use in making money with poultry on his farm, generally is not a correct theory and not a sound conclusion.

The subject assigned this morning is a specific one, the "Breeding of Poultry for Egg Production." The development of poultry husbandry in the East has been very largely along the egg producing line, because it has appeared to be the most profitable field up to the present time. I predict, however, that the day is not far distant when we shall have greater knowledge of the meat-producing values of poultry and that we shall give it quite as complete specific attention in our breeding. The industry needs it and there certainly is a wonderful field for development along the line of quick maturity of birds for meat production, having specially well developed bodies that will best meet the needs of the table as well as the production of high quality eggs. In a measure these two qualities can be worked out in the same individual, with perhaps as great money value in dollars and cents profit when all the factors are taken into consideration. I say this by way of explanation lest I be understood as thinking that we were ignoring the great meat qualities that always must be taken into consideration in any system of cost accounting of profits on a poultry farm.

The question of breeding poultry is especially important at the present time, due primarily to the increasing cost of the other factors of production. It costs us more to-day to feed our fowls than it did formerly, therefore it behooves us to see to it that the machines that we use in our manufacture of eggs and meat are of the very best quality, otherwise our food cannot be fed to the best possible advantage. With the higher price of house construction—because we are learning now the need of a good house if we are going to get the very best results in feeding or breeding, and with the increased cost of labor, reduced of course by various methods of labor saving appliances, but generally difficult to secure to work on the farm at reasonable rates, due to the competition of other industries, make it especially important that the birds that we do have shall all be good ones. Then taking into consideration the demand of the more critical public for a higher quality of product, it is absolutely essential for the person to-day who makes the best use of his poultry, to have birds that lay high quality eggs. They must have quality to compete and bring the prices.

We find that in trying to carry out this plan to secure a better quality and larger quantity of poultry that we have some exceedingly difficult problems to confront. It is a more difficult problem to breed poultry scientifically and well than it is to breed most other kinds of domestic animals, not because they are not more responsive. I

think that poultry is moulded in the hands of man as freely as any other kind of animal and perhaps more so than most of them, but it is because of the fact that the flock of poultry has so many in numbers and the individuals are so small, so short lived and so comparatively inexpensive that a person finds it exceedingly expensive and very difficult to carry out any systematic program of breeding, covering a period of years.

Let me illustrate with a flock of fowls: In order to know individual merit, it is necessary to record the bird's pedigree, leg band them, trap-nest them and gather the eggs five or more times a day, hatch the chicks, leg band and replace the leg bands, and make the records of the changes in leg bands as the chickens outgrow them and keep the records of all that is done. With a dairy of cows having instead of several hundred individuals to go through the laborious process that I have outlined with chickens, we have one tenth as many or less individuals and have only to use a milk scale twice a day, or weigh less frequently and to use the Babcock Tester occasionally and we can tell our best individuals. When we finally have the record of the hens, they are with us only two or three years at most. When we have the record of the cow and establish the fact that she is a good one, we have her for eight or ten or twelve years. You see, therefore, the great expense and the intricate amount of careful record keeping involved if we are going to be as careful and as systematic in the breeding of our poultry as we are in breeding some of our other domestic animals.

Notwithstanding all these difficulties, it pays to keep some kind of account of the difference in quality of our birds and to breed accordingly. However, we may not use trap nests the year round. We may not possibly use trap nests at all, but we had better use them for at least a few months in the fall as a check on the accuracy of our observations of external characteristics. We are seeking a way to find out how to pick out the more productive hens from the less productive hens and the more valuable males from the less valuable males, in order that we may mate more intelligently. Even if we cannot know absolutely what the records of the birds are to an egg or to know whether these birds actually have pre-potent powers of transmitting these qualities to the next generation, we can get a good general idea of their value. In order to bring out some of these facts, I want to take a little of your time to-day.

There are at least ten points that we ought to try to accomplish in the breeding of our poultry for better egg production. These will be brought out and illustrated as I talk; but I want to emphasize two or three of the more important ones right now. First of all, we must see to it that our birds have strong vitality and great native inborn constitutional vigor. That is the foundation and the cornerstone of success. Whatever other factor is involved, whatever other character may be considered, that one, above all others, should be the one on which we base our procedure because without the native vigor to stand up under heavy feeding, we never can expect to get a big response in growth or egg yield. We need also to have pure bred birds of some well known breed as our foundation. The poultry man who to-day is satisfied with anything short of a good, pure breed of some one of half a dozen or more of our well known varieties, such as Rocks or Wyandottes or Rhode Island Reds

or Leghorns or a number of others I might mention, is not living up to his immediate opportunities, because one can buy in any neighborhood with only a little additional expense for eggs or chickens, breeding quality that has taken men 50 to 75 or more years to bring up to its present state of perfection. You have then secured a foundation of uniform type as regards size and color, quality of egg, and of reasonably good production and good constitutional vigor if care is used in selection. We also need to have birds that have inherited a tendency to long life. The greatest handicap to-day to the poultry business is the comparatively short life of our birds. In Nature they might live 10 or 15 years or more; I have known them 13 years old in domestication. We have a number of hens in the college flock now that are 6 years old, many of them laying fairly well. We want to impress the inherited quality of longevity upon our birds because we know that if a bird is born with a vigorous constitution and the inherited tendency to long life, it will be easier to rear the chickens; we will be getting individuals that can stay with us for a period of years and make it unnecessary for us to go to the most hazardous, most difficult, and most expensive process connected with poultry farming, namely, the hatching and rearing each year of as many or more chickens as we have mature fowls on the place. With the present normal life of our domestic fowl, a profitable life of only two or three years at most, it is necessary for every poultryman in the country to hatch and rear each year as many chickens as he has capacity for mature hens on his farm. A 1,000 hen farm must rear every year at least 1,000, and ought to rear 1,200 or 1,500 chickens in order to allow rigid selection. If we can by any means develop birds with longer lives so that we can keep them 3, 4 or 5 years as choice selected individuals to breed from, then we are impressing quality of longevity and we do not have to go to that heavy expense of rearing so many chickens each year.

We need to develop the quality of producing fertile, hatchable eggs. Many a man has succeeded well in getting high egg production but failed to hatch the chickens. There seems to be a limit to the endurance of a hen to produce 150, 175, 200 or 250 eggs a year and have enough vitality left to give us healthy offspring. The dairy-men know what that means when they push their cows to the limit. It is the same with the hens. We must get reasonably high yields but this must be consistent with vitality in order that these birds will give us chickens as strong as their parents. If the poultryman cannot so organize his methods of breeding, feeding, housing and care that the next generation is going to be as good or better from the standpoint of fertility and hatching power and vitality, it will only be a few years before that person is out of the chicken business. Many a person has gone out by that doorway. There are some things that we know about breeding poultry, but not all. This question of securing heavy production, good fertility and strong hatching power is, at the present time, the most difficult thing we have to confront in breeding.

The next factor that we must consider is the question of quality of eggs. It is not simply the number of eggs that the hens lay that determine the profit. In my humble judgment we have been "barking up the wrong tree" a good share of the time in this question of breeding for egg production. The quickest results and the best pay-

ing results can be secured, not by increasing the egg yield even one egg per hen, but by improving the quality of the eggs that they lay. A person can increase the actual money earning power per hen anywhere from 25c to 75c per hen per year just by changing the size, shape and color of the egg without any particular extra effort on the part of the hen to produce this better quality. That is the easiest improvement to be made at the present time and yet it is one that is very seldom discussed or systematically practiced to any great extent.

Without attempting to go into details on some of the other factors to be considered, we will now have the lantern slides and bring out some of these points step by step in developing our subject. We will begin with the first factor, namely, that of constitutional vigor. We can always see things better by contrasts, so I have made a slide of one of the most abnormal, one of the worst possible specimens of low vitality. This bird actually existed. I photographed it myself and have pointed out by descriptive terms some of the vulnerable physical evidences of weakness which mark the individual. Most emphatically there is such a thing as constitutional vigor characteristics indicating strength or weakness that any person who is familiar with birds and who will study these characters can see for himself or herself and can pick out the birds of high and low vitality. I will guarantee to take this audience or any body of students and with one hour's talk with lantern slides and with the birds themselves, which is better than the lantern slides, make a large proportion of the class perfectly familiar with these characters so they can walk right in and pick out the birds of higher or lower vitality with almost unmistakable accuracy whether we are dealing with little chicks or with old fowls.

Let us briefly, with 3 or 4 lantern slides, point out some of these fundamental body characters that indicate vitality so that on going home you can go into your flock of birds and see whether you have among them any that show these particular physical characters. First of all, you will notice, as you examine that bird (Fig. 1) that it is developed abnormally, that it has an especially long, thin beak, thin body, long thin legs and shanks and long thin toes. The bird has simply responded physically to a weak constitution and Nature seems to understand that if a bird is unable to take care of itself, is not rugged, is not physically vigorous, that certain parts of its body grow while the others dwarf and stay dormant, so that the bird naturally takes on certain body characteristics as you can see by its attitude. It has a crouched position entirely abnormal. It does not stand up rugged and vigorous and virile. Is in a "dopey" sort of a condition. Therefore, look for the long flat thin head and beak, which we speak of as "crow-headed." Notice that generally there is a small, thin, pale comb; a dull, sunken eye, and drooping eyelids, thus indicating that it hasn't the life or vitality to keep its eyes open. Notice that there is a very sparse and irregular development of the plumage. A bird of high vitality generally is well plumed, glossy, full feathered, heavily feathered and quickly feathered. Note especially that they have a tucked up abdomen and a small development of the abdominal tract. Notice also that they generally have narrow, breasts, narrow

AN ABNORMALLY LOW VITALITY CHICK

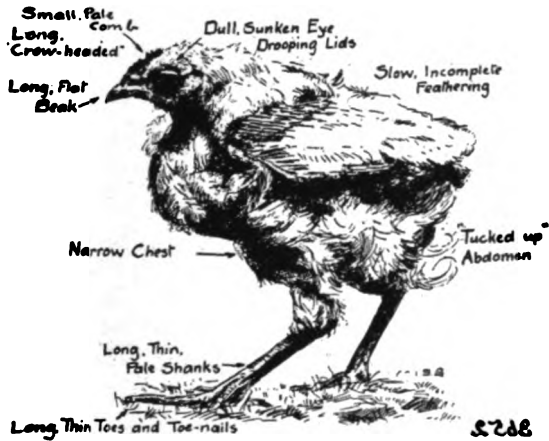


Fig. 1. An abnormally low vitality chick. Note the physical characteristics which indicate loss of physical vigor.

HIGH AND LOW VITALITY PLYMOUTH ROCKS

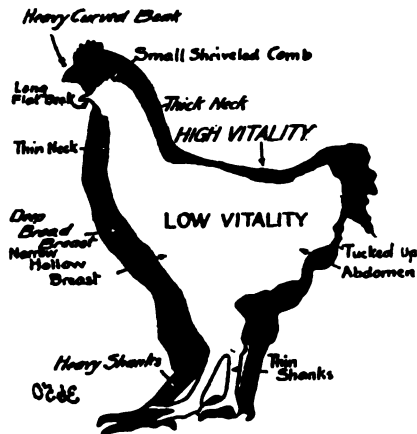


Fig. 2. Two Barred Plymouth Rocks. One high and the other low vitality, of similar age. Note the points of contrasts.

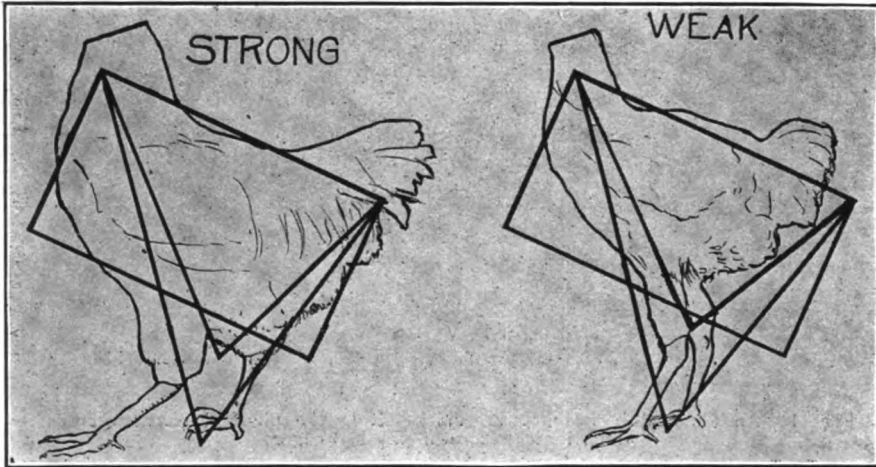


Fig. 3. Showing the way in which birds of high and low vitality fill a parallelogram and the two triangles. This clearly brings out the points of weakness in development of keel, breast and abdomen in the low vitality bird.

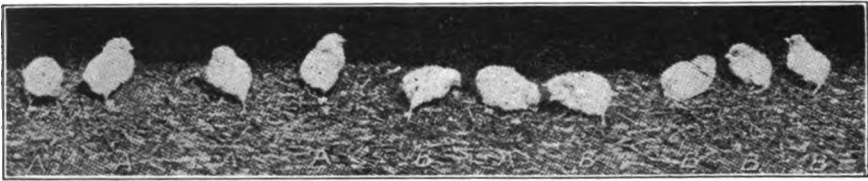


Fig. 4. Baby chicks just removed from the incubator. Note the difference in size, shape, and attitude of the body between A and B.

from side to side also from the back to the keel. These, generally then, are the main factors indicating low vitality. Primarily the differences are in the body capacity. Look for small body capacity, with low vitality, as contrasted with a very large, heavy body capacity with high vitality.

Perhaps you can see that better represented in Fig. 2 by super-imposing two Plymouth Rocks, one over the other. The low vitality bird is in white and the high vitality bird is in black. Now these were birds of the same age, and as you will see, almost of the same height, yet there were at least 2 pounds or more difference in weight. You will notice that all of the general characters that I mentioned in the previous slides are true here. Take this low vitality bird for example; there is a long, thin, flat beak, a thin neck, a thin keel, and a tucked up abdomen. There are the long legs and long shanks as compared to the high vitality individual that has such wonderful depth from back to abdomen, from back to keel, a heavy neck with a well rounded head, a medium to large comb, a heavy curved beak, heavy shanks. There in black is a high vitality bird. He is a splendid specimen of a Plymouth Rock from a constitutional vigor standpoint. This male unquestionably showed these characters from a baby chick right on up to full maturity and is worth infinitely more to kill to eat than the other one. He is a perfectly good specimen from the standpoint of his vitality for breeding purposes. The low vitality bird would not be worth anything from a breeding standpoint. Perhaps you can see the same idea brought out a little more graphically with the same individuals from a different photograph. (Fig. 3.) Here are the same two Barred Plymouth Rocks shown separately. By placing a parallelogram of the same size over the low vitality bird that you do over the high vitality bird here, you can see that the high vitality individual has a tendency to fill the parallelogram; the breast is full and deep so that it nearly fills it in front, and the abdomen is so full that it nearly fills it at the rear. We see that a bird of high vitality has the tendency to fill a parallelogram while a bird of low vitality is deficient in breast and abdomen. Notice the difference between that vacancy in the parallelogram at the breast and abdomen. That is the most convincing view you can get of birds of high or low vitality, and the same contrast would be true if you were looking at the birds from the rear or from the front, because the bird of high vitality is broad across the back and keel as compared to the bird of low vitality, which has a narrow back, narrow keel and is narrow between the legs. Frequently birds of low vitality have legs so close together that they nearly interfere. The bird of high vitality viewed from the front, the rear or the side fills a parallelogram while the bird of low vitality is more likely to fill a triangle. The same thing is true of the baby chicks. There is a baby chick (Fig. 4A) that is full of vigor, hard, full, round and plump, with an abundance of down lying close to the body. Here is another one, A, with its eye standing right out like a shoe button, the eye is full and expressive, the beak well curved and of good color, the chicken vigorous and active. One could have observed the vitality of these chickens even more accurately in life than by photographs. There is a chicken marked B of the same hatch, out of the same incubator. It has low vitality, and is a weak yeping individual that probably will not live long; if it does live, it will be a "delusion and a snare"

so long as you have it on the farm. Here is another (Fig. 4 B). There you see that same tendency to narrow chest, tucked up abdomen, and in the course of two weeks you see the same type of chickens. Notice that these three high vitality chickens (Fig. 5), with full developed bodies, strong wing pads, showing good feathering, with abundant down lying close to the head, and eyes, full and expressive; heavy curved beak; chickens that are upright, lively and peart. In Fig. 5 B are three chickens of the same age, with dropping wings. The wings of the weak chicks are not as large as those of the stronger chicks, but they look larger at first because the body of the weak chickens are so small. The bodies failed to grow. The attitude of the chicken indicates quite accurately its vitality. Here in Fig. 6 you will find four chickens of the same age, Rhode Island Reds, all hatched in the same incubator, brooded in the same brooder, fed on the same rations, and yet the largest chicken will weigh at least five times as much as the smallest chicken and will weigh perhaps a third more than the other two.

It is purely of inheritance or acquired weakness or both. These chickens marked A were born strong; the ones marked B were either born lacking vitality or acquired the weakness. They never can wholly overcome it. Sometimes they overcome it in a measure, but as a rule they are never chickens that could be kept on a farm beyond the broiler age with any degree of profit. The thing to do always in breeding up our stock is to select rigidly up to the time that we mate up our breeding pens, then select the eggs the right size and shape and with good strong shells, then select the strong germs. We have run experiments by which we could compare the strength of the germs every seven days and picked out those that were large and strong and vigorous and those that had low heart beats and small development. We carried them through to the hatching time and found a wonderful difference in the hatching power and strength of the chickens determined entirely two weeks before they were hatched just by the way the embryo developed. Whenever we see a low vitality chick at hatching time the thing to do is to kill it and at any time when they look listless at any age, dispose of them. After they reach an age of several weeks, frequently we can mark the weak ones with red paint and keep them until they are about one pound or more in weight and then sell them to make sure they do not get mixed up with the balance of the flock.

Here in Fig. 7 is the evidence of what can be accomplished by mere selection. There is a flock of pullets marked strong that were hatched from a flock of hens that had been selected for their strong vitality from a common lot. Here are pullets marked weak that are of the same age as these marked strong. They were hatched from eggs laid by hens that were of less vigorous vitality. Now the mothers of both of these flocks of pullets had all run together all summer long in the corn field and were simply picked out in November. The stronger ones were put in a pen and the weaker were put in another pen and the record kept of egg production, food consumed and hatching power, etc. The following fall, at the time this picture was taken, these pullets from the high vitality parents were laying; these from low vitality parents did not begin to lay for five to six weeks after the others; the former weighed half a pound apiece more at the time they were five months old than did the latter. That is a pretty big dif-

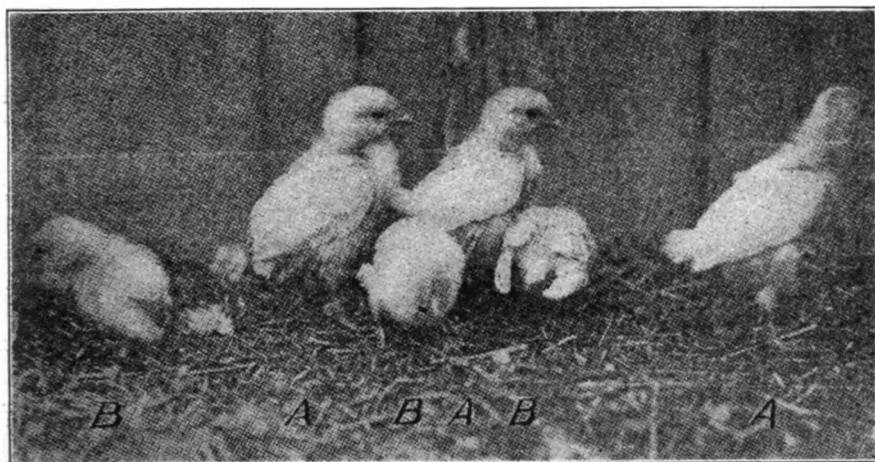


Fig. 5. Chicks 10 days old. Observe that in Group A the chicks are of larger size and with better developed wings and tail and with feathers close to the body, as compared with Group B.

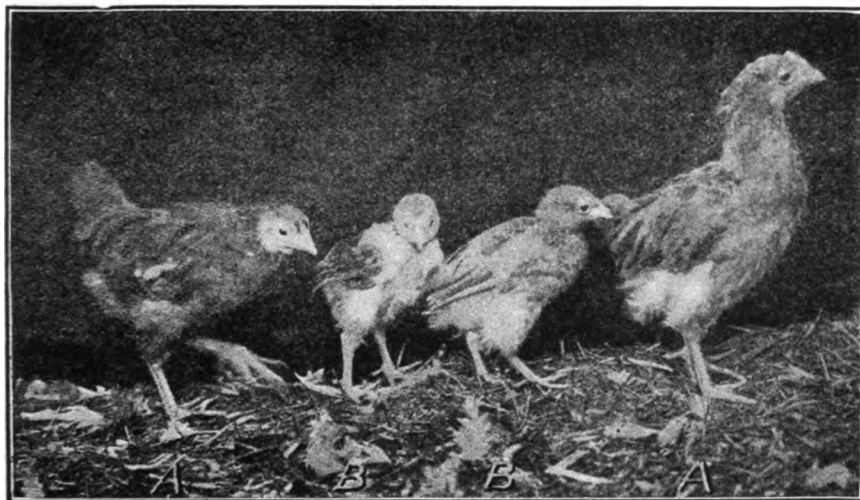


Fig. 6. Four chickens of the same variety, age and method of rearing. The difference in size is apparently due to an inherited weakness.

Offspring from Late Selection - Strong



Offspring from Late Selection - Weak



Fig. 7. High and low vitality groups of White Leghorn pullets indicating the way in which physical characters are transmitted from parent to offspring. The strong vitality group were from high vitality hens. The weak vitality group from low vitality hens.

Figs. 8A, 8B, and 8C. Three flocks of cockerels selected according to their physical vigor. Note the characteristic poses and actions indicating physical vigor or weakness.



Fig. 8A. Birds of high constitutional vigor.

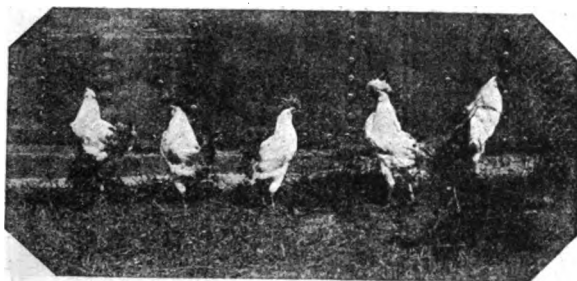


Fig. 8B. Birds of medium constitutional vigor.

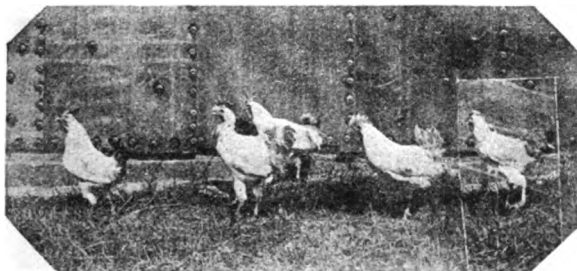


Fig. 8C. Birds of low constitutional vigor.

ference for Leghorns that would ordinarily weigh only $2\frac{1}{2}$ to $3\frac{1}{2}$ pounds apiece, due purely to a question of inheritance—they apparently inherited their vitality from the parents. They were better layers. The records showed that these pullets of high vitality, like their mothers, laid eleven and a fraction more eggs each year in the case of the mothers and between twelve and thirteen eggs per hen more in the case of the pullets than those of low vitality.

Knowing the audience that is before me, teachers who must know the truth, I know you will excuse me for discussing a question that, in some audiences, might be considered inappropriate or indelicate, I do not know of any way to impress the truth except by telling it. One of the most important problems that we, as poultrymen, have confronting us is the problem of getting fertility and hatching power in the eggs, particularly layers, in early spring. We all recognize the fact that there is a big difference in this respect between individuals. I think, as a rule, farmers are likely to pick out the best males as regards vitality if they make any selection at all unless they get blinded by the color as some do; they usually pick the biggest and most active ones. I think that as a general rule is a good rule. It is well that we have other matters under consideration at the same time. In order to know what the difference is between the active mating powers of the birds of high, medium and low vitality, we conducted some experiments this last Spring. We are continuing these experiments at the present time at the college. Birds of high, medium and low vitality are marked with different colored paints and then some person stays in the pen from morning until night, making accurate observations of the mating qualities of these birds with the same large flock of fowls in each instance.

Here (Fig. 8 A) is a picture of five males that were picked for their high vitality. Here (Fig. 8 B) are five picked for their medium vitality and here (Fig. 8 C) are five for their low vitality. These males had all been used in some sort of breeding experiments at the college and up to the time the observations were made they had all been running together at the close of the breeding season last Spring in one large flock out in a place that we had built especially for their accommodation in the summer. One of our students, with the aid of one of our instructors, went into that large flock of males and picked out these individuals because of vitality, their size, their activity, their evident gallantry, their sprightliness and those general characters that I have already described in the first slides shown in the lecture. They picked those marked low because they lacked in vitality qualities. They may have been just as large or they may have been larger in size, but they did not show those other characters that were necessary to get the right quality of vigor, and these marked medium were just about half way between the best and the poorest.

You will notice that this picture (Fig. 8 A) appears to be blurred. Though we took several pictures—we found it impossible to get one of that bunch of five without finding some or all of them scrapping. This picture shows that one fellow is spoiling for a fight, and this one is getting ready to declare war on that one and the other is not neutral by any means. Like the five nations of Europe, now at war, they are all at it, every last one of them. Among the low vitality you don't notice any evidence of scrapping. They are all looking

around to see if anything is coming to get them; every one of them is on the lookout to "get out of it." The strong birds are on the lookout to "get into it;" that is just the difference between the two lots. The high vitality want to get into the scrap, and the low vitality want to get out of the scrap, and medium vitality are about halfway between. Here are the actual results of the mating observations. These lines here shown in Fig. 9 represent efficiency in mating of the individuals in all the different times that they were compared. The largest lines represent the number of matings of males of high, medium and low vitality, so you will see how these different tests resulted. The figures are the results of the 1st, 2nd and 3rd tests with the same individuals. Here are the males of medium vitality, 1st, 2nd and 3rd tests. Here are the birds of low vitality, 1st, 2nd and 3rd tests. When you come to add all these three together in each of the three groups, we get these lines at the lower part of the illustration and we find that during those hours of observation on those particular days, there were 132 matings of these five individuals of high vitality, 64 of these of medium vitality, and 39 of these of low vitality. The question for us to settle is whether it pays to spend a little time in daily observation of the individual characteristics of our males before we undertake to let the result of an entire seasons' hatching go by with infertile eggs and inefficient matings just because we have not taken the time to find out whether the males were strong or weak.

Another factor of importance is to know how hens differ in fertility and hatching power.

A COMPARISON OF THE FERTILITY AND HATCHING POWER WITH THE EGGS PRODUCED PER HEN.

Eggs Laid in Two Years of Production.	Number hens.	Eggs incubated.	Per cent. fertile.	Per cent. chicks to eggs set.
175 or less,	5	58	100	99.0
176-225,	11	194	99.8	96.7
226-275,	27	427	94.9	88.2
276-325,	19	291	95.5	95.0
326-375,	16	241	95.4	93.6
376 and over,	4	64	92.8	48.2
Summary,	82	1,275	96.0	61.2

Table I. The way in which hens of widely different laying records differ in fertility and hatching quality of their eggs.

Table I shows the actual results of the carefully kept records of a year with birds in the college flocks. Here we find, all told, 82 hens under consideration that laid 1,278 eggs that were carefully tested. They averaged 93% fertile and 61% of these hatched. These hens are grouped into these different collections, those that laid in two years' time 175 or less eggs—that is pretty low production; 176 to 225, then 226 to 275. You see we increased about 50 eggs at a time or 25 eggs per year per hen is the difference in the grades here used. The number of hens in each one of these groups is shown and

the number of eggs used in each one; also the percentage of fertile eggs in each group, and the percentage of chickens hatched in each group. Notice that we get our best results ordinarily (with just one bare exception) in the percentage of fertile eggs that are laid by birds that are of medium to high production rather than with the birds that are either excessively high or excessively low producers. It would appear, therefore, from these data and other observations, that birds of low vitality do not give us good fertility or good hatching power because they are likely to be weak physically during the breeding season. It would appear that birds of exceptionally high egg yield failed to give us good fertility and hatching power because they have weakened themselves by heavy laying. In one case we did not get our good results because we had good hens that outdid themselves, and in the other instance because we had poor hens that were physically weak.

The next few slides will deal with some remarkable hens that have been discovered rather than produced, as a result of our trap-nest experiments. I hope to make the point clear, that in discussing these very high producing birds, that you should not give us any particular credit for it except as regards proper care, because, in my humble judgment, there are thousands of birds in this country exactly as good as the ones here shown, only they have never been discovered. They are in the flocks and doing the work; but it needs the trap nest to bring them to the surface. There is a little hen (Fig. 10) that laid 257 eggs weighing 29 pounds. She ate practically 110 pounds of feed and gave us 72 pounds of voidings and laid in one year's time, over five dollars worth of eggs at market prices. That bird (Lady Cornell) is one that ought to be perpetuated. These three birds are the most valuable fowls that we have discovered in the flocks. They are on their sixth year record. Some of these died in their fifth year; but we have others of the same general group that are still with us. This bird (Cornell Supreme), the best one of the lot, laid 665 eggs in three years' time and laid 225 eggs in her third year. These birds that died, apparently did so not because of any physical breakdown, so far as we could see. Cornell Supreme laid an egg the day she died. She suffocated during an exceptionally hot spell on a very sultry day two years ago, apparently when in the very best of health. Look carefully at the type of those three high producing birds. They are alike. I don't believe that it is possible to absolutely pick out an egg type fowl and say that this bird is or is not purely on account of its *shape* a high producer. I am a firm believer in certain physical characters, as indicating production. At the same time there is something inborn in the bird that does not always necessarily show in shape, that determines her high producing power.

**YEARLY RECORDS FROM DATE FIRST EGG WAS LAID OF SOME OF
THE HIGH PRODUCING HENS AT CORNELL UNIVERSITY**

Date hen laid first egg.	Hen number.	Name.	Eggs laid first year.	Eggs laid second year.	Eggs laid third year.	Eggs laid fourth year.	Total four year record.
Dec. 6, 1909	2,211	"Lady Cornell,"	258	200	191	123	†772
Nov. 24, 1909	9,363	"Madam Cornell,"	245	131	163	83	†622
Nov. 20, 1910	5,697	"Cornell Prolific,"	243	162	146	119	870
Dec. 8, 1910	5,636	"Cornell Laywell,"	205	165	159	124	653
Dec. 10, 1909	3,418	"Cornell Supreme,"	242	198	225	124	*789
Dec. 4, 1908	1,463	"Cornell Surprise,"	180	186	196	.....	562
Dec. 8, 1911	8,696	"Cornell Persistent,"	192	197	178	.....	567

*Fourth year incomplete. Died July 3, 1913.

†Four years complete. Died in fifth year.

‡Three years complete. Died fourth year.

§Three-year record.

Table II. A list of the first, second, third and fourth year records of seven high producing hens at Cornell University.

We now come to the question of breeding our birds with regard to discovering their ability to live long and produce well,—which may be called their longevity. Here are the records of a good sized group of birds that have now completed, in this instance, their four year records, but we have their fifth, in which, it is seen that this particular bird laid 772 eggs in the four years' time, laying 258 eggs the first year, 200 the second, 191 the third and 123 in the fourth year. The best bird in the lot, laid 242 the first year, 198 the second, 225 the third and 124 in the fourth, or a total of 789 eggs in the four years' time. Here is a bird that is exceedingly surprising and she was named Cornell's Surprise on that account because she laid 180 eggs the first year, 186 the second and 196 the third, increasing her production each year. This bird we still have with us and we are hoping for great things because of her persistency in production, laying such a high average each year, 192 the first, 178 the third, or a total of 567 eggs in the three years' time.

A Member: I note all these hens began to lay very late in the Fall. Do you intend that that should be so?

PROF. RICE: No sir. Ordinarily it would not have been true, but the birds were hatched late and therefore began to lay late. If these birds had been hatched early they unquestionably would have begun early to medium early in the Fall to lay.

A Member: How late?

PROF. RICE: Frequently when they are around five or six months old. Some of our high producing birds, however, do not begin to lay until they are six or seven or eight months old. The birds that do not begin to lay until they are nine or ten months old, almost always are medium to low producers. In order that we may

find out how important that is, we keep our best birds for a period of several years. We are going to call attention to some of these distribution records of hens whose records are known for three years, to show how easy it is for a person to kill the best hens he has on his farm and never be any the wiser unless he knows their individual records.

DISTRIBUTION OF EGG PRODUCTION BY ONE YEAR PERIODS AS AN INDICATION OF PROLIFICACY. THREE CALENDAR YEAR RECORDS OF 169 S. C. WHITE LEGHORN HENS AT CORNELL UNIVERSITY.

Groups.	Number of hens.	Per cent. of total.	Average production, first year.	Average production, second year.	Average production, third year.	Total average production, three years.	Three-year rating of groups.
I,	80	47.84	158.68	127.60	102.91	389.19	3
II,	6	4.73	91.00	107.86	115.25	314.13	2
III,	21	12.43	149.86	111.95	120.33	382.15	4
IV,	21	12.43	95.48	134.28	119.53	349.29	7
V,	21	12.43	119.06	133.90	99.38	352.33	6
VI,	11	6.51	130.45	121.27	133.09	389.83	2
VII,	1	.69	86.00	64.00	64.00	194.00	10
VIII,	2	1.18	100.00	129.50	129.50	269.00	5
IX,	2	1.01	58.50	58.50	63.50	180.50	11
X,	1	.69	147.00	147.00	132.00	426.00	1
XI,	1	.69	80.00	72.00	80.00	232.00	9
Total for all groups,	169	100.00	136.92	124.48	109.13	370.57	.....

Table III. Tables showing the distribution of egg production for three years in groups to show when they made their largest, medium and lowest production.

These are the records, shown in the case of 169 hens that lived for three years and were trap-nested. This does not take into consideration any of the hens that died in that time; it means all the hens that lived for that length of time that were in this experiment. We grouped these according to whether they laid the most eggs the first year, the second year or the third year. You see if we have the three year records of 169 hens, they must have laid the most or the least or the medium production of eggs the first year or the second or third year or else they must have laid the same number two or more years, hence we have grouped them up that way and we find that out of the 169 hens 47% or 80 out of the lot laid the most the first year, less the second and least the third; that the order of the production was highest in the first year and then a declining scale for the other two years and they laid 389 eggs in the three years time and stood third in the list of groups. The next group reversed the order. There were only 4.79% but their order was the least the first year, more the second and most the third, but laying all told only 314 eggs in the three years time. They were poor producers even though they increased each year for three years never laying an average of more than 15 eggs in any year. Then we had a group of 12 and a fraction per cent. that laid most the first, least the second and came up in the third and laid 382 eggs in three years, only 7 less than the group we

first considered. Then we had a group of 21 birds that made the poorest record the first year, best the second and medium the third, 349 eggs, and they stood seventh. We then had a group of 12% that laid the minimum the first, the most the second and the least the third. They laid 352 eggs. Then we had a combination that laid medium the first, least the second and most the third; they laid 389 eggs and stood second in the combination. Finally the highest group record in three years' time was by an individual that was a consistently high layer and laid the same number the first and second years and laid in three years' time 426 eggs. The poorest one of the lot laid 232 eggs in three years only about 78 eggs a year. The point that should be emphasized is, that one can never know absolutely, the best hens in his flock unless he knows their records for at least two or three years, for sometimes they come up surprisingly in the second and third years and very frequently the birds that make the best records the first year, that is a very high or abnormal record, will be the birds that lay less eggs in their next year and rest, and come up again and lay more eggs in the third year than in the second.

A Member: Does your experiment only apply to Leghorns or all types?

PROF. RICE: I think it would apply to most breeds of Leghorn type. I do not believe it would apply in the same way with the heavier breeds; I think there would be a tendency perhaps for some of the heavier breeds to lessen in their production a little more rapidly as they grow older and yet that is only a guess.

A Member: Were these birds all treated the same in feeding and otherwise?

PROF. RICE: Oh, yes. They were all kept on the same farm, fed by the same man and had the same kind of rations. It is very fortunate that we have not varied our rations at the college in our experiments with birds for the past 7 or 8 years.

The next factor we want to consider is the question not merely of the eggs that hens lay over a period of years, but it is the eggs that they lay during various months of the year. What we want to know is the dollar's worth of eggs that hens lay. We not only want a hen to lay many eggs but to lay just as many as possible when they are high in price. One egg in the fall is worth three or four eggs in the spring. It is exceedingly important that we get a hen that distributes her production properly. We want October, November and December layers, and, therefore, that factor ought to be taken into consideration always in selecting our birds. They lay more dollars worth of eggs than with only fair production than the others even though they may not lay as many eggs in a year as hens that do not lay well in the fall. Generally, however, we have this in favor of the fall layers as pullets or hens that our records show that almost invariably the birds that lay the most eggs in the months of September, October, November and December, whether they are hens or pullets, are the birds that have also laid the most eggs in

the year. The birds that only lay in the spring never lay eggs frequently enough to make up for the lost time in the fall and winter. The supreme test of the high producing quality of a bird is the number of the eggs she lays when the conditions are most unfavorable. This statement I am well aware is contrary to the opinions of some practical poultrymen and investigators, but I am perfectly willing to assume the responsibility for its accuracy.

Now just get this point. Never undertake to pick out high producing hens when the conditions are favorable for production. At this time all or nearly all the hens both good and poor are laying. When climatic conditions are against them the good ones only continue to lay.

A Member: Do you advise to feed these hens all they wish to eat when they are under this test?

PROF. RICE: Yes sir, all that they wish to eat of the right kind of dry mash feed, but not all the grain they want to eat. So long as they have all they can eat of dry ground feed, with its meat, bran, middlings, cornmeal, etc., fine ground dry feed and possibly a wet mash a day; and so long as they eat it up clean, there is little or no danger of overfeeding. The danger of overfeeding any flock of fowls is when they can eat all the grain, whole or cracked that they want without working for it. They are likely to fill up on it and become lazy and inactive, and lacking the physical activity or the keenness of appetite to exercise they become less productive.

A Member: Would it make any difference if they had a little feed left in the evening?

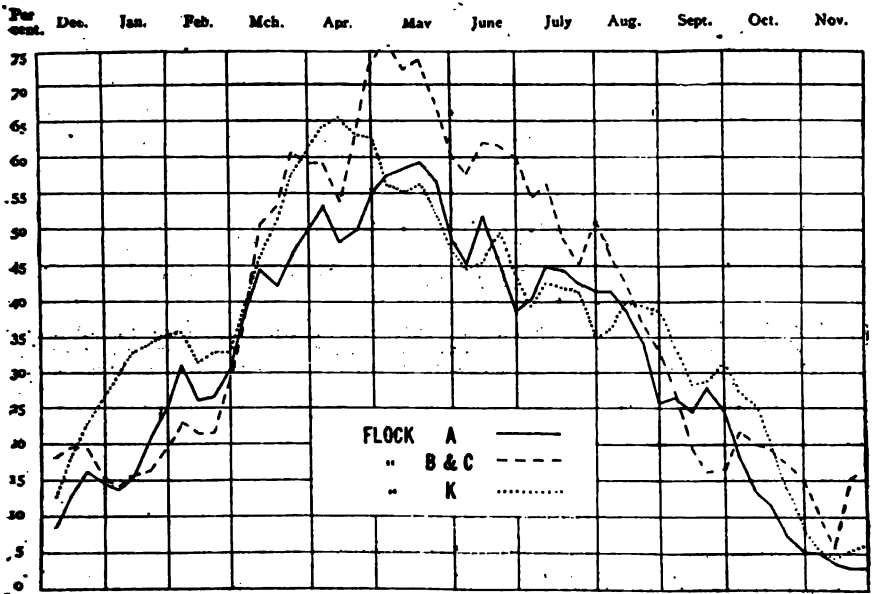
PROF. RICE: Not at all, so long as they cleaned it up promptly the next morning. I think the idea especially in the winter of letting them have a little grain left over at night, so long as their appetites are kept keen, is a good one.

We ought to study the normal curves of production at different months. This slide (Fig. 11) represents the monthly percentage of production for a year, of three separate flocks of fowls in different parts of New York State, several hundred fowls were in each flock. The records were kept by men who knew nothing about what the other co-operators were doing and yet when these records were sent in every month and tabulated and plotted up at the end of the year, we find with what great uniformity these three flocks of fowls produced their eggs. Beginning over here in December we find that in all three instances their production was less than 20%. In some instances it was as low as 12% to 15%; that in the month of January it came to about 20% and 25% or in one case as high as 35%. In February they all came up a little; one dropped a little temporarily; then in March they all gave a big jump to 45% or better. In April it was up to 50% to 65%; in May one flock went as high as 75% and the others dropped a little; then came up slightly; in June they began to go down; then lower in July, lower

in August, lower in September, lower in October, and reached their lowest point in all instances as low as 5% to 7% production per hen per day. We find that with mixed flocks of old and young Leghorns, as these were, farm flocks, that we can calculate with a good deal of accuracy about how the curve of production is likely to flow, in any year with any flock under normal conditions. This particular man who had the fowls represented by these dotted lines, had almost all pullets. The other two flocks contained a larger percentage of hens. One can count very readily on the higher percentage of production in those months with the pullet flock than you can with the older hens.

We are going to come to a little more detailed study of records of trap-nested hens at the college. Here are the records (Fig. 12) of 38 hens for three years. The solid line representing the first year, the dash and the cross line representing the second year, and the dash and dot line representing the third year of production of the same hens shows how the 38 hens laid each month of the year for three years. One record super-imposed directly over the other, will therefore show how they vary according to their ages in production. You will notice that the first year their record was 10% or 12% in November, that it was about 20% to 25% in December; that it dropped in January, came up perceptibly in February and up higher in March and still higher in April, and dropped a little in May, but sustained a pretty high egg yield clear through June into July, then began to go down gradually in August and September, and landed a little higher in the following fall than any of the others, so that you can see that in the first year, pullets, if they are hatched early so that they can begin properly to lay early in the fall, will lay much heavier percentages of production in October, November, December and January, when prices are high, than they will ever do after that; that they will also continue a high production the first year, all the way through, and lay a higher production in the following fall than do the hens in later years if all the birds are taken into consideration on which to base flock averages. In the second year they are slower to begin to lay in the fall. In third year, they are still slower to begin to lay in the fall. They all come up to about the same place, regardless of their age, during April, May and June. They all begin to go down just about the same way during July, August and September, but they quit a little earlier in the fall in the case of the older birds. Do you see the point? The tendency is to shorten up the production in those months of unfavorable laying conditions.

We have plotted curves of production shown in (Fig. 13) of each of three flocks of fowls, namely: 22 hens, that were hatched May 2nd; 21 that were hatched May 20th, and 20 that were hatched May 31st, to see how the time of hatching affects the production of the birds, not only the first year but the second and third year. Do you all thoroughly see the point? It is one of the most important factors in the successful commercial handling of birds, to get the pullets hatched at the right time of the year. We can hatch pullets too early or we can hatch them too late, depending upon the breed, the season and the location in which we happen to be living. If we hatch our pullets too early, they mature and begin to lay



The percentage egg production for each month of the year varies with great regularity one year with another, always being lowest during October, November and December, and highest during April, May and June. Observe the wonderful regularity in egg production of three flocks as shown above.

Fig. 11. Plotted curve showing percentage production of three flocks of fowls in various parts of New York State. Observe the comparative uniformity in production of each of the flocks for the various months of the year.

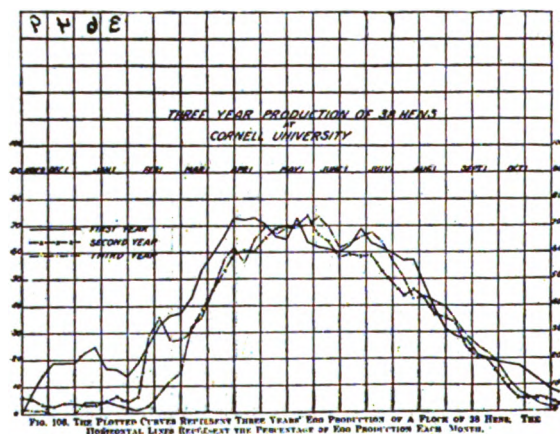


Fig. 12. Plotted curve showing the yearly production of 38 hens for each month of the year for three years. Observe the higher production the first year during the fall and early winter months as compared to the same fowls in later years.

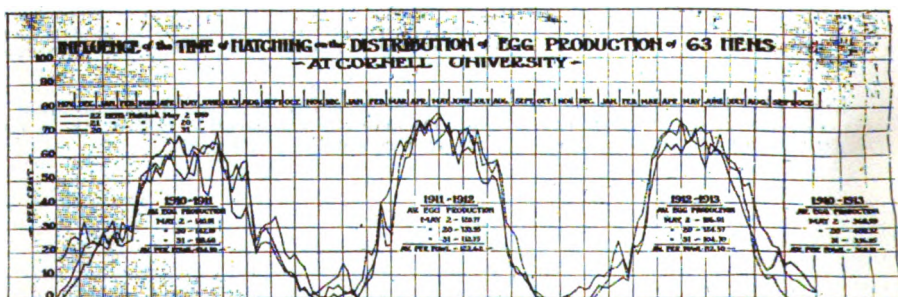


Fig. 13. Three years production of three flocks of fowls hatched at different times in the spring as indicating the effect of time of hatching on egg yield.

too early in the summer, in hot weather. They then go through a moult and are caught by the cold weather of the fall with their overcoats off, so to speak, and then they do not lay well during the early winter. If on the other hand they are hatched too late, they then are not fully plumed when the cold weather comes and as a result they, too suffer from the cold and do not lay well. The ideal conditions in New York State with Leghorns is to hatch the birds so that they will be ready to lay just before cold weather comes. The exact time that is best will vary a little one year with another. One cannot tell in advance, but we find that hatching in May—never as late as June, if we can help it, and never as early as March, but somewhere during April and May, and probably the very best about the first of May, in the long run gives us our best results, and yet when we come to consider the record of these three flocks of birds all reared the same way, hatched from the same kind of stock and given the same kind of care, the 22 hens hatched May 2nd, the 21 hatched May 20th, only three weeks later, and the 20 hatched on the 31st, which is only 11 days later—we find considerable difference in their production.

Now let us notice that, of the first hatch, they laid 140 eggs; the second hatch laid 142 and the third hatch laid 118 eggs the first year; the second year, the first flock laid 120 eggs, the second laid 133, the third laid 112. The third year the first flock laid 106 eggs, the second laid 124, the third flock laid 104; so that those birds that were hatched the 31st day of May, practically the first day of June, apparently were hatched just a little too late to get ready to lay when the early fall cold weather struck them, and they did not get under motion early enough in the fall and they never got over the handicap. All the way through the three years' time they were the last in the race. Now taking the 3 years' production as represented by all these plotted curves for each month of the three years, we find that the birds that were hatched on May 2nd, laid 363 eggs; those that were hatched May 20th, laid 400 eggs; those that were hatched May 31st, laid 336 eggs. If you will study the curves, you will see that point brought out clearly, namely: That as the hens get older, they lay just about the same number of eggs, same height of production in the months of April and May. Now notice that this curve of percentage of production is higher in the second and third years, even during April and May, than it was in the first. Why is that? Simply because in the first year they laid so heavily in these early fall months that it reduced their production a little in the early summer; whereas in the second year and the third year, they began later and later to begin to lay in the fall; consequently, when they began to lay, they gave a heavy production in those two particularly favorable months of April and May. When you come to plot the fourth and fifth years, as we are doing at the College, we find that they still maintain high yields in April and May; but they begin later and later to lay in the fall and quit earlier and earlier the following summer. I predict that when we keep those birds, as we hope to do, as long as they live, we will find that they will only lay eggs eventually, if they lay at all, in the months of April and May, the most favorable season of the year.

There in Fig. 14 is a study that gives us the actual daily egg production of each one of those birds that we saw represented in the previous illustrations. The first year's production of every one of those birds is shown in colors. Let us understand what this key represents. The first year's production for each month, beginning with November first until the following November, each block represents the days a fowl lays; a vacant space represents the time she did not lay. We have arranged these birds into three groups; the upper group was hatched May 2nd; the middle were hatched May 20th; the lowest were hatched May 31st. Each group you see was a different brood. Then each one of these groups are arranged according to time each one of the pullets in the group to the left began to lay. To the left are the leg band numbers of each fowl.

When we started the records in November, four birds were laying. How many eggs they had laid before we caught them in the trap-nest, I don't know, but I think you can get a pretty accurate idea when you study these records of production below, because you see these four had begun to lay when we started, this one laid next day, this one next and this one three days later, and so on until we find one hen that did not begin to lay until way over here the last of April. Notice the second hatch. The first hen began to lay a week after we started the records; the next one a week later, the next two or three days later, and so on, until the last one in that hatch began to lay the last of March. Then here is the third hatch—the first one began to lay two weeks after we started the record, and the last one began to lay way over here the last of April, but notice the point that they began, as a group, to lay just about the same time as the difference in the time of their hatching, i. e. each of the groups when we consider them in mass usually are two to three weeks late in production. Now you will say, I would like to know what those birds are going to do the following fall? If these birds, hatched a little later in the spring, began to lay later in the fall they must lay later the following fall. Let us see whether they did or not. Follow these lines and you will find these birds that were hatched first began to lay first, and were still laying the last day, absolutely the last day of October of the following year. How about the second hatch? Well there were three or four still laying at the time the year closed. How about the last hatch? Just about the same. In other words, here is what happens, as the next picture will show. (Fig. 15). When the cold fall weather strikes the hens they all respond in essentially the same way regardless of the time they were hatched the previous spring. That is exactly what these birds did, all stopped essentially at the same time, almost regardless of what time they began to lay. They did lay a little more heavily in the spring if they started a little later in the fall. You will notice in the first group there are more vacant places, representing the days the hens did not lay, scattered around in March, April and May because they had laid so heavily in the early fall. The later hatched pullets never caught up in their production. The second year (Fig. 15) these birds that were hatched late did not get down to business any earlier than the others. When you come to the third

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Fig. 14. Daily distribution of egg production of 63 fowls to show the way in which the time of hatching affects the time of laying.

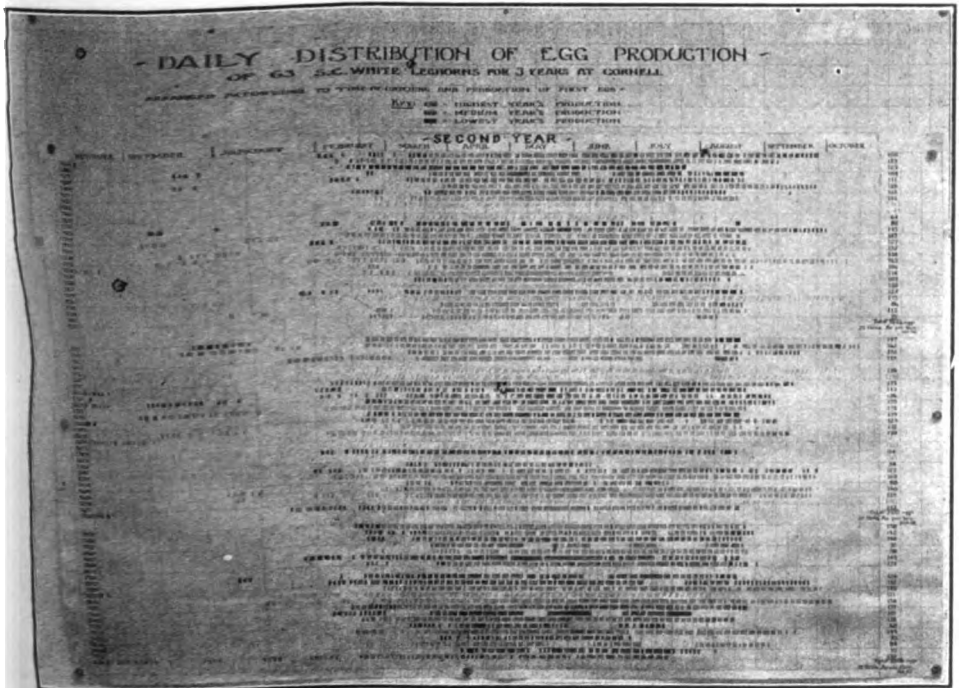


Fig. 15. Second year of daily distribution of egg production.

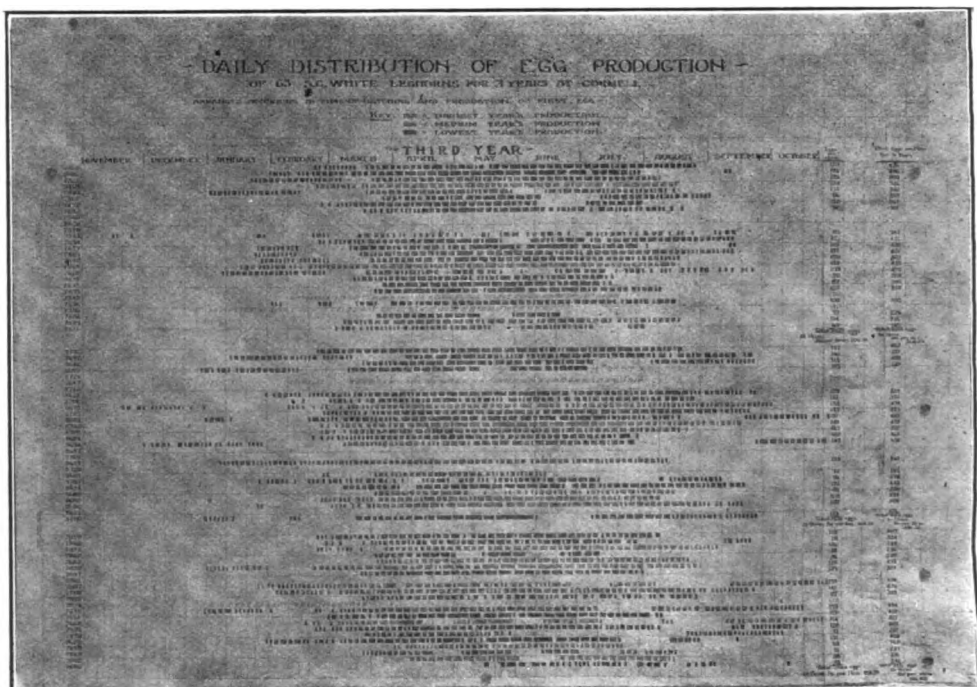


Fig. 16. Third year of daily distribution of egg production.

year, you will find that they did not continue any later. The point is that if birds are not hatched early enough to begin business early in October and November, they never get over it, never catch up the lost time. Here is the third year (Fig. 16), the same birds, and you will notice that each year there is less and less production in the fall of all three groups, but they hold to their heavy production in these early months, as shown by the previous slide.

Before we can make very much progress in breeding for egg production, we must decide on the meaning of some terms. I have taken occasion a good many times to talk with people about their ideas as to what constitutes good egg production. A man will say, "Oh I think a hundred egg hen, or a hen that is laying 125 eggs per year is doing pretty well." Another man will say, "A hen is no good unless she can lay 150 eggs or 200 eggs." If we are to decide what is a high egg yield, we must decide whether we mean the first, second or third year records or the total one, or three year production, so I took a test one day of 13 persons who had a good deal of experience in the poultry business and asked them to give an estimate of what they considered an egg yield should be to fit the following terms, phenomenally low, exceptionally low, very low, fair, medium, high, very high, exceptionally high, phenomenally high. There are some good terms to express yields of what would be considered a good flock of birds given good care on a poultry farm. What would they be expected to do to fit these terms? Here is the result based on the average of all replies:

A SYMPOSIUM OF GUESSES AS TO A GOOD AVERAGE FLOCK EGG PRODUCTION PER HEN PER YEAR TO FIT DESCRIPTIVE TERMS INDICATING VARIOUS GRADES OF PRODUCTION.

	1	2	3	4	5	6	7	8	9	10	11	12	13	Total	Av.
Phenomenally low,	50	25	25	25	20	30	20	20	40	25	70	20	50	420	32.3
Exceptionally low,	60	50	60	40	40	40	30	40	60	40	75	30	60	625	48.
Very low,	70	75	80	50	60	50	40	60	75	60	80	40	75	815	62.7
Low,	100	100	100	95	80	70	50	80	90	80	90	60	100	1095	84.2
Fair,	125	115	125	115	100	85	60	95	110	105	100	100	115	1350	103.8
Medium,	150	125	150	125	120	100	75	110	125	125	110	115	125	1555	119.6
Good,	175	135	165	135	140	130	100	125	140	180	125	150	140	1790	137.7
High,	200	160	180	150	160	160	125	145	160	140	140	180	150	2040	156.9
Very high,	230	175	200	160	180	180	160	165	180	160	150	200	160	2300	176.9
Exceptionally high,	250	200	225	180	200	190	200	180	200	170	155	215	175	2540	195.4
Phenomenally high,	275	225	240	200	220	200	225	300	225	180	160	230	200	2790	213.9
Totals, ...	1685	1375	1550	1275	1320	1235	1085	1220	1405	1215	1255	1340	1350	17310	

Table IV. A table giving the result of estimates of the egg yield that would fit descriptive terms to indicate the productive power of fowls.

Phenomenally low, 32; exceptionally low, 48; very low, 62; low, 84; fair, 103; medium, 119; good, 137; high, 156; very high, 176; exceptionally high, 195; phenomenally high, 213. For a flock of 100 birds laying 213 eggs per hen per year I think if you search the United States from one end to the other you would not find them. You can see by these figures what some poultrymen of the country think about what constitutes high, medium, low or average production.

Our next problem is to try to find out how to pick out the high producing birds without the use of trap-nests, or perhaps, if we have trap-nests, when it will pay us best to use them. I should say that the first principle in selecting birds for egg production aside from their constitutional vigor would be to begin with their fall records as pullets, with this principle in mind, that an individual is likely to show early in life those characters that are likely to dominate it throughout life. We find that when our pullets are put to this test that if they are hatched at the same time early in the spring, say in April or May, and we know their ages so that chickens of the same age can be compared, if with good care they do not lay before they are 8 months old, we are pretty sure that they are not going to be high producing birds if we should keep them for a period of years. Once in a while we find an exception to this rule, but rarely, so that the earliness with which a pullet begins to lay—and by earliness I mean their *age* and not alone the time of the year that they began hatching.

EARLY EGG PRODUCTION AS AN INDICATION OF PROLIFICACY. THREE CALENDAR YEAR RECORDS OF 169 S. C. WHITE LEGHORNS AT CORNELL UNIVERSITY.

Group According to Age First Egg was Laid.	Number of hens.	Per cent. of total.	Average age when first egg was laid.	Average production first year.	Average production sec- ond year.	Average production third year.	Average total production for first three years.
151-180,	4	2.37	176.25	173.25	135.75	126.50	435.50
181-210,	71	42.01	199.77	157.01	133.63	116.41	407.05
211-240,	52	30.77	222.46	140.10	121.37	106.19	367.66
151-240,	127	75.15	208.32	150.00	128.67	112.54	391.21
241-270,	23	13.02	255.50	108.10	121.05	106.50	335.65
271-300,	11	6.51	285.09	93.91	93.56	84.27	271.74
301-330,	6	3.55	315.50	88.33	129.00	107.67	325.00
331-360,	1	.59	359.00	45.00	75.00	69.00	189.00
476,	1	.59	476.00	27.00	155.00	125.00	308.00
1,100,	1	.59	1,110.00	.....	.....	8.00	8.00
241-1,110,	42	24.85	299.88	95.55	111.81	99.00	306.36
Total,	169	100.00	231.08	136.92	124.48	109.18	370.57

Table V. Table giving the egg yield for three years of 169 fowls in groups according to the age at which they laid their first egg.

The age at which pullets lay their first eggs is a very safe guide in making our first selection for high producers. Here is the result of actual trap-nest records of 169 hens. This table is so arranged that we find over here to the left the groups according to age in days when they laid their first egg. The first group laid when they were 151 to 180 days old, and each of the other groups are 30 days older; for example, 181 to 210 days, 211 to 240 days, or just a month older for each group. You can easily remember how one group differs from the other by 30 days. There were 4 in the first group, 71 in the second, 52 in the third group, and so on, and when the three first groups are assembled they averaged to lay when they were 151 to 240 days or 8 months old, and include 127 birds

out of 169. Now the balance of them, the other 42, laid when they were 241 to 270 days old; and so on down to the smaller birds in the groups. The next column shows the average age when the first egg was laid, 176 days, 199 days, 222 days; or an average of 208 days old for that group of 75% of the birds. Do you get the point, that out of 169 birds, 75% of them, $\frac{3}{4}$ of the birds, had begun to lay when they were an average of 208 days old. Now the average production for these birds the earliest to begin to lay for the first year, for the second year, for the third year and for the three years combined, is as follows: The first group, 173 eggs the first year, 135 the second year, 126 the third year, or a total of 434 eggs in three years. Those that began a month later, laid in the order of 157 eggs the first year, 133 eggs the second year, 116 eggs the third year, a total of 407. Those that began a month later, that is, two months later than the first group, laid 140, 121, 106 eggs per year respectively, a total of 367 eggs. Now the 75% of these birds averaged to lay 150, 128, 112 per year, or a total of 391 eggs in three years. Let us take all these birds that did not begin to lay until after that age, the older groups, and you see what a sudden dropping off in production there is of that group, that did not begin to lay until they were an average of 255 days old; they laid in the order of 108, 121 and 108 eggs. Those that were in this later group, laid a month later; 93 the first year, 94 the second year and 93 the third year, and so on down. We have an average total of 370 eggs for the early producers as against 306 for the late. In other words, we find that the birds that laid by the time they were 8 months old, as a rule, are likely to be high producers, whereas those that do not lay until after that time are likely to be low producers.

THE INTENSITY OF EGG PRODUCTION AS AN INDICATION OF PROLIFICACY.*

Leg Band No.	1st Year.		2nd Year.		3rd Year.		Total eggs laid in 3 years.
	No. days continuous laying.	No. eggs laid.	No. days continuous laying.	No. eggs laid.	No. days continuous laying.	No. eggs laid.	
5697.	15	243	5	162	6	146	551
7518.	5	221	8	163	4	109	493
7880.	5	161	28	145	12	159	465
5675.	3	148	5	136	6	155	439
7709.	5	152	5	185	6	141	478
5705.	5	151	12	142	12	133	426
6705.	6	140	7	149	9	131	420
7676.	4	159	4	114	3	133	406
5633.	5	137	11	424	3	139	400
7397.	3	138	9	107	13	105	350
7455.	3	118	11	104	6	124	346
7469.	6	106	21	101	12	114	321
7669.	7	106	7	72	6	58	236
7669.	6	83	8	86	6	57	226
7658.	2	45	2	53	2	65	163

*Fifteen Single Comb White Leghorns at Cornell University selected from sixty-three whose Records are known for three years or more.

Table VI. Table showing the yearly record of hens arranged according to the number of eggs that they laid continuously at any time during the year.

One of the theories that has been advanced in regard to the methods of picking out high producers has been to find the birds that lay most continuously without a skip. We have picked out 15 birds from the flock representing birds of continuous laying qualities. These birds have been arranged in the order of the eggs they laid during three years. (Table 6). The highest producing hen laid 551 eggs and so on down to 163 eggs in three years, the lowest producer in that lot. The various hens had the second of continuous laying without missing a day as follows: 15, 5, and 6 days and so on for the others. Here is a hen, 7880, that laid 28 days without skipping a day, and laid 459 eggs in three years. Here is a hen that had a record of never having laid over two days consecutively and she gave us 65 eggs each year or a total of 163 in three years time. We have a record of one hen that only laid 3 eggs in three years time and did not lay these until toward the end of the third year.

I see that my time is getting away and that Brother Wittman is going to be crowded off the program if I do not hasten. In Fig. 17 is a picture of a hen that gave us our first clue in 1906 to the idea that the way a hen moults in the fall is an indication of her laying capacity. The late moulting of hens give us the second method of picking our birds as high producers. Let us review the steps. The first thing to do is select for vigor, the second is to pick out the early laying pullets; the third is to watch these selected pullets in the following fall of the year to find out whether or not they moult late and lay late. Late moulting is an indication of late laying. This bird (Fig. 17) laid us 200 eggs between January 24 and October 12th, when this picture was taken. The next slide, Fig. 18, shows that same bird in full moulting condition. You will notice that she has a perfect egg type, a body deep from the back to the keel, deep from the back to the abdomen, good, heavy shanks, set wide apart; well developed head, large, vigorous body. This slide shows the hen taken the last of November when she had completed her record of 216 eggs for the year, and at that time was the highest producing bird we had. This picture was taken a few days after she was at her worst; she had begun to get her new plumage but she gave the key to the whole situation as to that factor as a means of indicating production. There is a picture of Cornell Supreme (Fig. 19), the best hen we have ever discovered. That picture was taken the 6th of December. We find that every one of our phenomenally high producing hens those that lay around 200 eggs or more a year, are birds that do not moult until in November and December, and yet all these years we must confess that until these facts were brought out, we have been inclined to kill the hens that moulted late, just because they committed the crime of laying too many eggs. We thought that if hens moulted late, they would not lay early in the fall. The fact is that those hens that moult late begin to lay more quickly, frequently, than the poor producing hen that moult in July, August or September.



Fig. 17. Hen No. 61. An individual that gave the first clue to the factor of late molting as an indication of late laying and high production. Observe the fine egg type of a high producer.

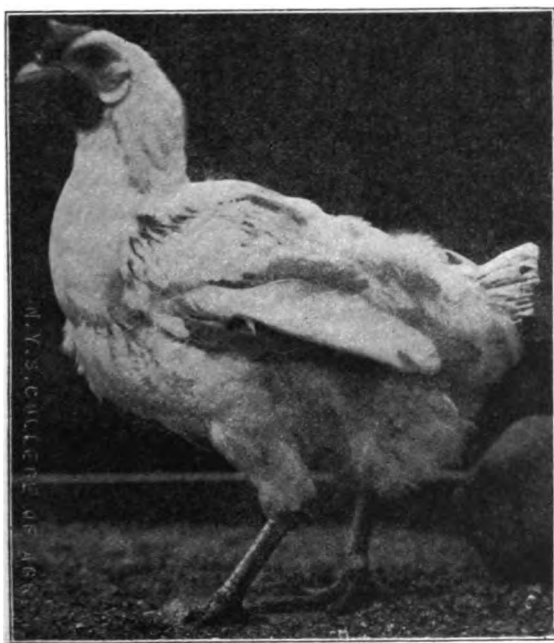


Fig. 18. Hen No. 61 in full molt just growing a new coat in the latter part of November.

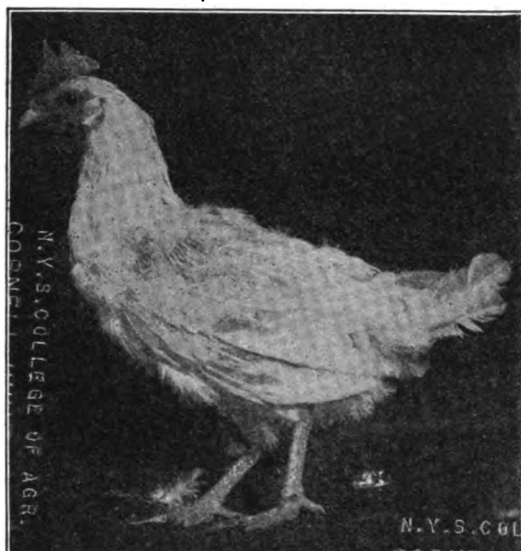


Fig. 19. Cornell Supreme in full molt, December 6th.

EGG GRADING BOARD									
LARGE	1	2	3	4	5	6	7	8	9
SMALL	10	11	12	13	14	15	16	17	18
CRACKED	19	20	21	22	23	24	25	26	27
	28	29	30	31	32	33	34	35	36
	37	38	39	40	41	42	43	44	45
	46	47	48	49	50	51	52	53	54
	55	56	57	58	59	60	61	62	63
	64	65	66	67	68	69	70	71	72
	73	74	75	76	77	78	79	80	81
	82	83	84	85	86	87	88	89	90
	91	92	93	94	95	96	97	98	99
	100	101	102	103	104	105	106	107	108
	109	110	111	112	113	114	115	116	117
	118	119	120	121	122	123	124	125	126
	127	128	129	130	131	132	133	134	135
	136	137	138	139	140	141	142	143	144
	145	146	147	148	149	150	151	152	153
	154	155	156	157	158	159	160	161	162
	163	164	165	166	167	168	169	170	171
	172	173	174	175	176	177	178	179	180
	181	182	183	184	185	186	187	188	189
	190	191	192	193	194	195	196	197	198
	199	200	201	202	203	204	205	206	207
	208	209	210	211	212	213	214	215	216
	217	218	219	220	221	222	223	224	225
	226	227	228	229	230	231	232	233	234
	235	236	237	238	239	240	241	242	243
	244	245	246	247	248	249	250	251	252
	253	254	255	256	257	258	259	260	261
	262	263	264	265	266	267	268	269	270
	271	272	273	274	275	276	277	278	279
	280	281	282	283	284	285	286	287	288
	289	290	291	292	293	294	295	296	297
	298	299	300	301	302	303	304	305	306
	307	308	309	310	311	312	313	314	315
	316	317	318	319	320	321	322	323	324
	325	326	327	328	329	330	331	332	333
	334	335	336	337	338	339	340	341	342
	343	344	345	346	347	348	349	350	351
	352	353	354	355	356	357	358	359	360
	361	362	363	364	365	366	367	368	369
	370	371	372	373	374	375	376	377	378
	379	380	381	382	383	384	385	386	387
	388	389	390	391	392	393	394	395	396
	397	398	399	400	401	402	403	404	405
	406	407	408	409	410	411	412	413	414
	415	416	417	418	419	420	421	422	423
	424	425	426	427	428	429	430	431	432
	433	434	435	436	437	438	439	440	441
	442	443	444	445	446	447	448	449	450
	451	452	453	454	455	456	457	458	459
	460	461	462	463	464	465	466	467	468
	469	470	471	472	473	474	475	476	477
	478	479	480	481	482	483	484	485	486
	487	488	489	490	491	492	493	494	495
	496	497	498	499	500	501	502	503	504
	505	506	507	508	509	510	511	512	513
	514	515	516	517	518	519	520	521	522
	523	524	525	526	527	528	529	530	531
	532	533	534	535	536	537	538	539	540
	541	542	543	544	545	546	547	548	549
	550	551	552	553	554	555	556	557	558
	559	560	561	562	563	564	565	566	567
	568	569	570	571	572	573	574	575	576
	577	578	579	580	581	582	583	584	585
	586	587	588	589	590	591	592	593	594
	595	596	597	598	599	600	601	602	603
	604	605	606	607	608	609	610	611	612
	613	614	615	616	617	618	619	620	621
	622	623	624	625	626	627	628	629	630
	631	632	633	634	635	636	637	638	639
	640	641	642	643	644	645	646	647	648
	649	650	651	652	653	654	655	656	657
	658	659	660	661	662	663	664	665	666
	667	668	669	670	671	672	673	674	675
	676	677	678	679	680	681	682	683	684
	685	686	687	688	689	690	691	692	693
	694	695	696	697	698	699	700	701	702
	703	704	705	706	707	708	709	710	711
	712	713	714	715	716	717	718	719	720
	721	722	723	724	725	726	727	728	729
	730	731	732	733	734	735	736	737	738
	739	740	741	742	743	744	745	746	747
	748	749	750	751	752	753	754	755	756
	757	758	759	760	761	762	763	764	765
	766	767	768	769	770	771	772	773	774
	775	776	777	778	779	780	781	782	783
	784	785	786	787	788	789	790	791	792
	793	794	795	796	797	798	799	800	801
	802	803	804	805	806	807	808	809	810
	811	812	813	814	815	816	817	818	819
	820	821	822	823	824	825	826	827	828
	829	830	831	832	833	834	835	836	837
	838	839	840	841	842	843	844	845	846
	847	848	849	850	851	852	853	854	855
	856	857	858	859	860	861	862	863	864
	865	866	867	868	869	870	871	872	873
	874	875	876	877	878	879	880	881	882
	883	884	885	886	887	888	889	890	891
	892	893	894	895	896	897	898	899	900
	901	902	903	904	905	906	907	908	909
	910	911	912	913	914	915	916	917	918
	919	920	921	922	923	924	925	926	927
	928	929	930	931	932	933	934	935	936
	937	938	939	940	941	942	943	944	945
	946	947	948	949	950	951	952	953	954
	955	956	957	958	959	960	961	962	963
	964	965	966	967	968	969	970	971	972
	973	974	975	976	977	978	979	980	981
	982	983	984	985	986	987	988	989	990
	991	992	993	994	995	996	997	998	999
	1000	1001	1002	1003	1004	1005	1006	1007	1008
	1009	1010	1011	1012	1013	1014	1015	1016	1017
	1018	1019	1020	1021	1022	1023	1024	1025	1026
	1027	1028	1029	1030	1031	1032	1033	1034	1035
	1036	1037	1038	1039	1040	1041	1042	1043	1044
	1045	1046	1047	1048	1049	1050	1051	1052	1053
	1054	1055	1056	1057	1058	1059	1060	1061	1062
	1063	1064	1065	1066	1067	1068	1069	1070	1071
	1072	1073	1074	1075	1076	1077	1078	1079	1080
	1081	1082	1083	1084	1085	1086	1087	1088	1089
	1090	1091	1092	1093	1094	1095	1096	1097	1098
	1099	1100	1101	1102	1103	1104	1105	1106	1107
	1108	1109	1110	1111	1112	1113	1114	1115	1116
	1117	1118	1119	1120	1121	1122	1123	1124	1125
	1126	1127	1128	1129	1130	1131	1132	1133	1134
	1135	1136	1137	1138	1139	1140	1141	1142	1143
	1144	1145	1146	1147	1148	1149	1150	1151	1152
	1153	1154	1155	1156	1157	1158	1159	1160	1161
	1162	1163	1164	1165	1166	1167	1168	1169	1170
	1171	1172	1173	1174	1175	1176	1177	1178	1179
	1180	1181	1182	1183	1184	1185	1186	1187	1188
	1189	1190	1191	1192	1193	1194	1195	1196	1197
	1198	1199	1200	1201	1202	1203	1204	1205	1206
	1207	1208	1209	1210	1211	1212	1213	1214	1215
	1216	1217	1218	1219	1220	1221	1222	1223	1224
	1225	1226	1227	1228	1229	1230	1231	1232	1233
	1234	1235	1236	1237	1238	1239	1240	1241	1242
	1243	1244	1245	1246	1247	1248	1249	1250	1251
	1252	1253	1254	1255	1256	1257	1258	1259	1260
	1261	1262	1263	1264	1265	1266	1267	1268	1269
	1270	1271	1272	1273	1274	1275	1276	1277	1278
	1279	1280	1281	1282	1283	1284	1285	1286	1287
	1288	1289	1290	1291	1292	1293	1294	1295	1296
	1297	1298	1299	1300	1301	1302	1303		

There are three distinct external characters that we have found and have tested out and therefore know will work, all of which can be put into practice without ever using a trap-nest. Now get these points clear. First, always pick out the hens that are vigorous and healthy; second, pick out those hens that moult late; and third, pick out the hens that have pale shanks; fourth, pick out the hens that have smooth texture to their combs late in the fall of the year.

Our Mr. Kent and two helpers, examined a thousand hens or more, whose records are known for a period of years. They examined them and made a record, first, as to whether they were moulting early or late; whether their shanks were very pale or very high color or anywhere between; whether the texture of the comb was soft and pliable or whether it was dry and hard; and they put those three characters together in the order of one, two, three, four, five in grades, from the highest to the lowest, that is to say, if a bird was all feathered out new, she counted as five because she was an early moulter; if she was all ragged at that time in October, she counted as "one" because she was perfect, a perfectly late moulter, or a hen might be anywhere between an early and a late moulter, one, two, three, four, five. They made the test as regards color of shanks, and texture of comb, and then added those figures up for each bird and, without knowing the records of the birds, because they were down in the office. They simply adding up the score of each one of those birds, based on that arbitrary mathematical figure of proportion of those three characters, and could tell with a great deal of accuracy whether these birds were high producers or low producers. They did this with all the hens that were trapnested simply for the purpose of ascertaining the facts.

Every farmer can take those visible characters with certain caution always in mind to guard against error in judgment. First always consider constitutional vigor of the bird—she may have pale shanks because she is sick, she may moult late because she is unwell and cannot shed her coat, she may have a dry comb because she is ill; the first thing to decide is that she must have constitutional vigor. Having satisfied that, then find out whether she is an early, medium or late moulter. Pick the late moulter. The third is, look at the color of the shanks. If they are pale, it indicates that she has laid the color out of her shanks. If they are high colored, it shows that she has been loafing around doing nothing but boarding on you and you are keeping her for the sake of her society. We have found some of the finest looking birds in our flock, beautifully plumed, their plumage shining and their combs red and their shanks as yellow as could be found that hardly laid fifty eggs a year. The fowls having soft, pliable combs are in a laying condition.

PRICES PER DOZEN FOR EGGS IN LEADING CITIES, NOVEMBER, 1910.

Grades.	New York.	Philadelphia.	Boston.	Chicago.	Average.
Large.					
Whites I, .....	.52	.35	.46	.35	.41
Browns II, .....	.41½	.36½	.46	.35	.39
Mixed III, .....	.37½	.32	.46	.33	.36
Medium.					
Whites IV, .....	.42½	.34	.43	.33	.36½
Browns V, .....	.35½	.32	.43	.33	.35
Mixed VI, .....	.32	.32½	.43	.30½	.32½
Small.					
Whites VII, .....	.31	.26	.30	.28	.27
Browns VIII, .....	.28½	.25	.30	.29	.26½
Mixed IX, .....	.21½	.28	.25	.28	.24½
Miscellaneous X, .....	.19½	.....	.17	.19	.19½

Table VII. Table showing the price per dozen for various grades of eggs in four principle markets of the United States, showing the great contrast in price due to size, shape and color.

Just a word now in regard to the quality of eggs. Breed for quality. In Table 7 are the prices that we secured by writing to large dealers in New York, Philadelphia, Boston and Chicago, and get the average of those four cities for eggs that were large, medium and small, and among each of those three groups based on size, whites, browns and mixed colors, so that we have 9 groups of eggs, large, medium, small, and white, brown and mixed colors of each size, and here are the prices in New York. The prices were taken in November, 1910, and the same thing would be essentially true this year, or perhaps—a little lower—large white, 52 cents; large browns, 41½ cents; mixed colors, 37½ cents; and yet they are all large, all weigh two ounces and a quarter or more, just the difference in color; all of equal freshness, all of the same candling quality in every way, except the mere matter as to whether these eggs were white, brown or mixed colors. Then come the medium eggs, that would weigh under two ounces, but approximately that; white, 42½ cents;—still more than the large browns; the browns, 35½ cents; mixed colors, 32 cents. For small eggs, the white ones, 31 cents; the browns 28 cents and the mixed colors 21½ cents. Now coming to the average of all three cities, we find the large whites, 41 cents; large browns, 39 cents; large mixed, 36 cents; mediums, whites, 36½ cents; browns, 35 cents; mixed, 32½ cents. Of the small ones, whites, 27 cents; browns, 26½ cents; mixed, 24½ cents, and extreme difference of 24½ cents as compared with 41 cents.

A Member: You speak of freshness; how old has an egg to be until it is not fresh?

PROF. RICE: Well, sir, that depends upon the season of the year and how collected. Eggs can be gathered once or twice a day, taken directly from the nest, carried immediately to a cool place, having fresh clean air, where they cannot evaporate, and may be kept there for a week's time and no one would ever recognize the

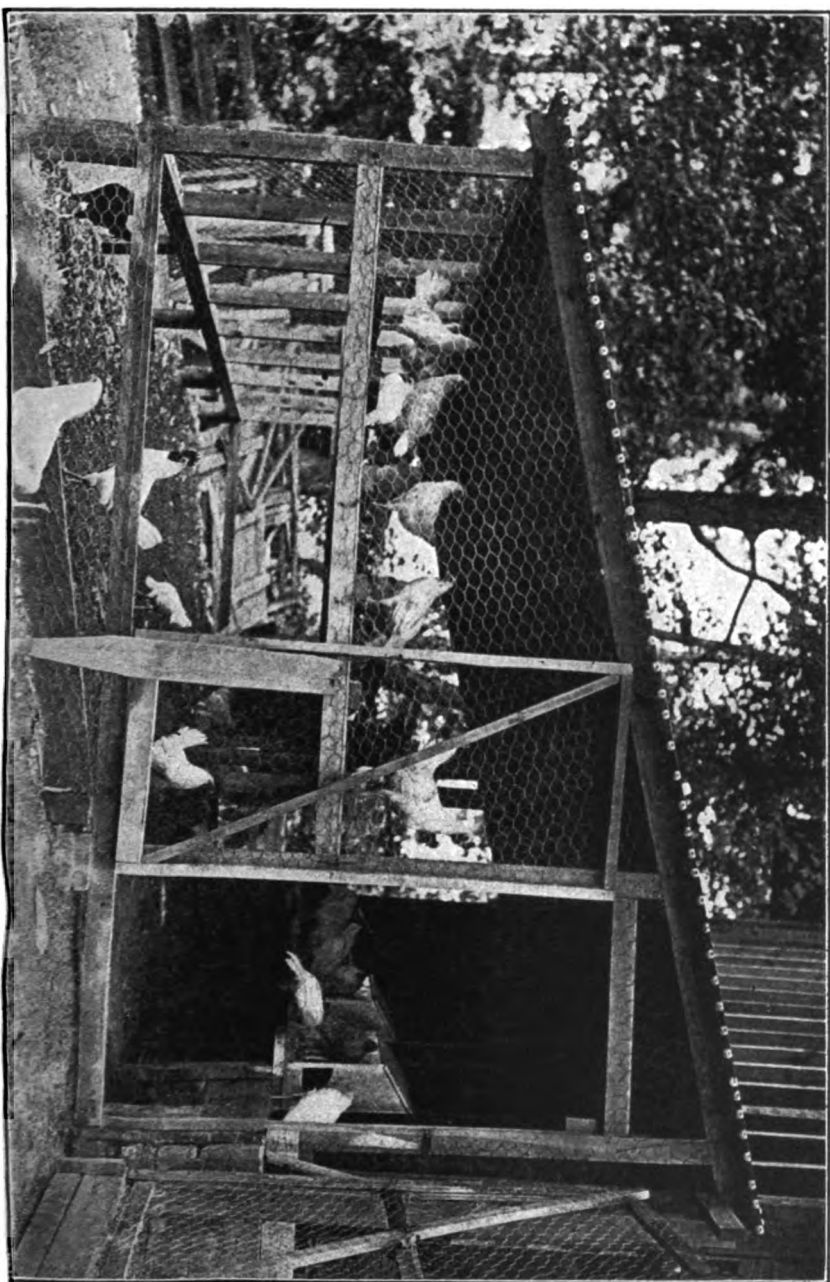


Fig. 21. An open shelter for the breeding males during the hot weather season, when males should be separated from the breeding flock to prevent fertilization of eggs and insure better keeping quality.

difference in the egg and those newly laid. On the other hand, if those eggs were left in the nest or in a hot room, they would deteriorate more in 48 hours than they would in a week under ordinary, desirable cool conditions.

A Member: How about it if they were put in liquid glass?

PROF. RICE: That seals the pores and they retain their quality so far as evaporation is concerned all right but lose a little in flavor if they are kept for many months, but they are all right for almost all cooking purposes.

A Member: What is the difference in quality between an egg kept in cold storage and one kept in liquid glass, both for the same period?

PROF. RICE: The egg kept in cold storage frequently suffers on account of fungii entering the shell. There are several fungii the spores of which if the air is damp that can get through the shell of an egg in cold storage especially that affect the flavor and appearance of the egg but that cannot penetrate it at all in water glass. Water glass simply preserves the egg in the condition it was by keeping the germs from getting inside. •

A Member: What is the difference between an egg that is fertile, and one that is unfertile, if any?

PROF. RICE: I do not know what the actual difference would be if a fertilized and unfertilized egg were immediately put under the same cold temperature conditions. I do know that under ordinary care, the germinal spot of an egg that has been fertilized will begin to grow quickly, at a temperature of 70 degrees or about that temperature—and that is pretty low temperature too. It is living room temperature. When the chick begins to grow, the white patch due to cell divisions shows very quickly, and of course if the temperature is 90 degrees or near 100 degrees, as it is frequently on a hot day in a nest or in a kitchen that egg within 48 hours, would have a little white patch over the surface of it and might have a little red streak that would show to such an extent the egg would be unsalable, would disintegrate and go to pieces in cold storage. That is why the cold storage people would prefer to have February, March and April eggs, and keep them two or three months longer, than to put the eggs of June, July and August into cold storage. The liquid glass would not affect that situation due to fertilization at all; the liquid glass only affects the conditions that go through the pores of the eggs; the fertilization is affected by the temperature.

A Member: Exclusion of air has no effect on the progress of fertilization?

PROF. RICE: No, not at all, as far as I know; but you must get an egg cooled down quickly to at least 50 degrees or thereabouts to stop development.

A Member: Isn't it a fact that the Pennsylvania eggs which are going into cold storage in this State, or in other words, the egg that is going into cold storage in the State of Pennsylvania, is not a Pennsylvania egg, for the simple reason that the western

egg is a better keeping egg? I cannot account for it by anything else except that a great many egg producers in the western states take the cockerels away from the hens.

PROF. RICE: Well, I want to say a word on that, because there is a great deal involved. I realize fully the importance of keeping the males away from the hens during the hot weather season; but I am not in sympathy, most decidedly not in sympathy with the slogan unqualified to "Swat the rooster," that is heralded all over the South, although undoubtedly it is more important for them than for us, because we have less length of hot weather season than they have. They mean all right in trying to keep the males away from the hens, that should be done even in this State, and New York State or anywhere; but the slogan of "Swat the rooster" results in the killing of thousands and hundreds of thousands of roosters all over the country that should not be killed and is defeating one of the most important ends of good breeding. They are forcing the breeders to depend upon the young and frequently immature males for all of their mating and they are killing all the fine males that prove to be desirable at the end of that first season, or the second season. How many of our males that have stood all of the tests of the most rigid selection as cockerels, break down in the second year? And then how many fall by the wayside in the third and fourth years? When you can find an individual that has stood up through all these breeding seasons and still has virility and vitality, that bird is a bird in a thousand, and we cannot afford to sacrifice him. What would become of the beef or the dairy and horse interests of this country if they depended upon yearlings or two year olds for breeders every year? The principle is dead wrong to kill off the males each year. We must keep our best males just as long as they retain their vitality. We must find a way to take care of them during the breeding season and after the breeding season so they will not suffer in vitality.

A Member: Do you use that male on his own flock the following year, for two or three years?

PROF. RICE: I think that question has never been very well worked out, as to how long it is safe to breed the same sire upon his own offspring, yet my opinion is that the tendency of close in-breeding has the effect of reducing longevity by killing off the males that ought to be kept on their farms for breeding for a period of years. I tell you, friends, when you get a male that is good enough *to breed from*, he is one in a hundred perhaps, one in five thousand. If you never have gone through the experience of reducing 100 males by the rigid process of elimination of the poorest down to the two or three best, you have never gotten your full education.

A Member: Isn't it a fact that the male you describe is no longer a rooster, but that he is a breeding animal?

PROF. RICE: Yes sir. He is a breeding animal, but he is also a rooster. If they could only make the distinction between good roosters and poor roosters it would be all right. I am not saying this in criticism, Mr. Wittman, I am saying though, that the way in

which the "Swat the rooster" campaign is promulgated through the country gives the farmer the impression that he should kill every rooster in sight. Now that is not right. I would rather have a male that is two or three or four years old and equal in vitality as he frequently is than I would a cockerel of the same variety; you know just as well as I do, men who have had much experience in selecting males, that you may pick five males out of a hundred and breed them for one season and find that several of them have lost their vitality and virility. I know that you can in-breed and retain vitality and you can in-breed for high vitality and increase it, but I believe that the tendency of mating together close relationship is wrong and we ought to get outside of our own lines occasionally, but I also want to say that more people make the mistake of trying to get new blood into their flocks every year just because of the supposed desirability of new blood, than the people who stay pretty largely within their own lines. We never can make permanent progress in improving the quality of our eggs or the number of eggs laid if we are going to get somebody else's males or females into our flock every year or two. The chances are that we may reduce our vitality, we may reduce our general quality—we may reduce both the number of eggs and the quality of the eggs by so doing. What we want to do is to find some person in our neighborhood who is doing the same kind of breeding we are and then exchange the best birds with him. Let him pick these from your flock and you pick the best from his.

In Fig. 20 is seen how a 30 dozen case of eggs looks picked up in the country at random and graded according to the three sizes, three colors, as indicated in the previous slide, then figured up at the following prices for each of those grades. That particular case of eggs, under those circumstances, would have been worth \$11.14 at the prices quoted for each grade separately and sold at the grade price. If, however, that 30 dozen case of eggs had all been of the first grade, large and white, it would have sold for \$15.60 instead of \$11.14. If, however, that whole case of eggs had been of this small, mixed color eggs, it would have sold for \$7.80, instead of \$11.14. When one can make a difference of 5 cents to 10 cents a dozen in the price of the eggs and a hen lays 10 to 12 dozens eggs a year, you can see for yourself that five times eleven is 55 cents, gross income per hen due purely to the quality of the egg she lays.

The figures show an important principle in selecting eggs for hatching; if we are going to get eggs that are of large size we must use the same kind of an egg for hatching. If we expect to get birds of good size, we must use large eggs for hatching, assuming that we have the same breed under consideration. Here is the way it will work (Table 8.) Here are eggs that were selected as small eggs; they weighed 1.66 ounces; here were eggs selected from the same flock that weighed 1.90 ounces; here were large eggs that weighed 2.35 ounces; now then, at the end of the time when those chickens were hatched, the eggs were in the proportion of 100 to 114 and 141. Assuming the first ones as one hundred, then these were 114 and these were 141 in size. This is at the time of hatching. Now here is the weight of the chickens when they were 20 weeks old; 1.87, 2.29, 2.65; and here is the proportion which you can compare with that; 100, 122, 142. There are the actual weights of the eggs out of which the chickens hatched. Here is the weight of the chickens

from each of those groups, 20 weeks old, and here is the proportion; in other words, one hundred is to 141 as one hundred is to 142; in other words, the size of a chicken of any given variety is in the proportion of the egg out of which it was hatched. If you want to get a large sized chicken, pick the good sized eggs to get a good sized chicken to lay a good sized egg to hatch a good sized chicken.

WEIGHT OF EGG TO WEIGHT OF CHICKEN.

Eggs.	Average weight of eggs.	Per cent. weight.	Average weight chicken 20 weeks old.	Per cent. weight.
Small,	1.66 oz.	100	1.87 lb.	100
Medium,	1.90 oz.	114	2.29 lb.	123
Large,	2.35 oz.	141	2.65 lb.	142

Table 8. Table showing the exact weights of eggs and of chicks indicating the fact that the size of the egg of any given breed determines the size of the chick.

Fig. 21 is just a suggestion for keeping males cool and away from the hens during the summer time. It means that there must be a wire covered place that could be locked up so that the chickens could go in and out; on the north side of some building where it is cool, comfortable and congenial, with a large number of feeding hoppers and watering devices, both inside and out of the building so that the strong males cannot fight the others. The great difficulty of keeping many males together is in making them all go to eat or drink out of the same places. If they are scattered all through the woods, with plenty of room to range and lots of room in a building where they can get away from each other, it is not so difficult to take care of them for that length of time, and I think we owe it to our stock to keep our best males rather than to kill them; but if we were to "swat" all the rest of them, it would certainly be a great blessing to the community.

Finally, and lastly, we want to bring out the fact of good care of our birds during the winter if we are going to get the best results in breeding. No amount of good breeding will ever take the place of poor ventilation of our hen houses or poor care of our hens, and while it will not be possible to speak of these things in detail here, I want to point out for a moment a new idea, at least new to us, a method of ventilation to take the place of the muslin curtain in certain parts of the United States. I do not know that it would have application in the south but it certainly does in the north. This is a wind buffer, not an ordinary shutter, but a combination of louvers placed at different angles to prevent the snow, wind and rain from blowing into the house and for allowing the air to change freely through the house without draft. In Fig. 22 is shown a building that we used for two

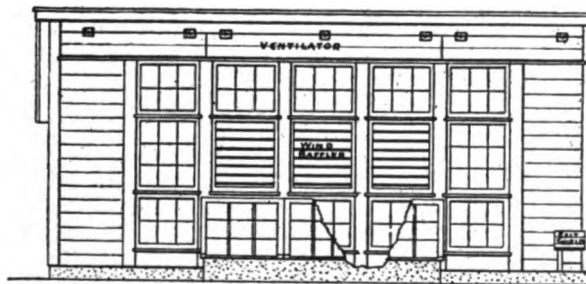
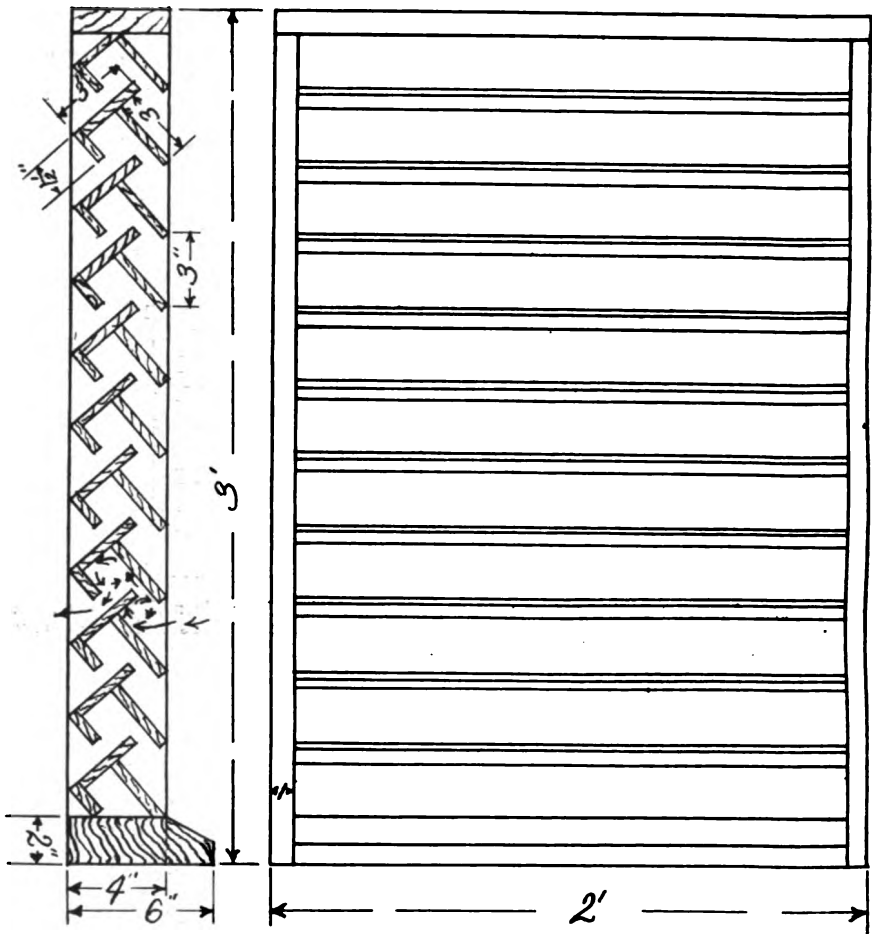


Fig. 22. The front of a modern poultry house designed by Cornell University to show the use of the wind barrier and a larger proportion of glass to insure greater warmth, dryness, sunshine and fresh air.

CORNELL WIND BAFFLER.



*Arrows show how wind whirls
when passing through the baffle.*

Fig. 23. Working detail drawing showing the construction, front and cross section, view of the Cornell wind baffle which effectually provides for free circulation of air without drafts.

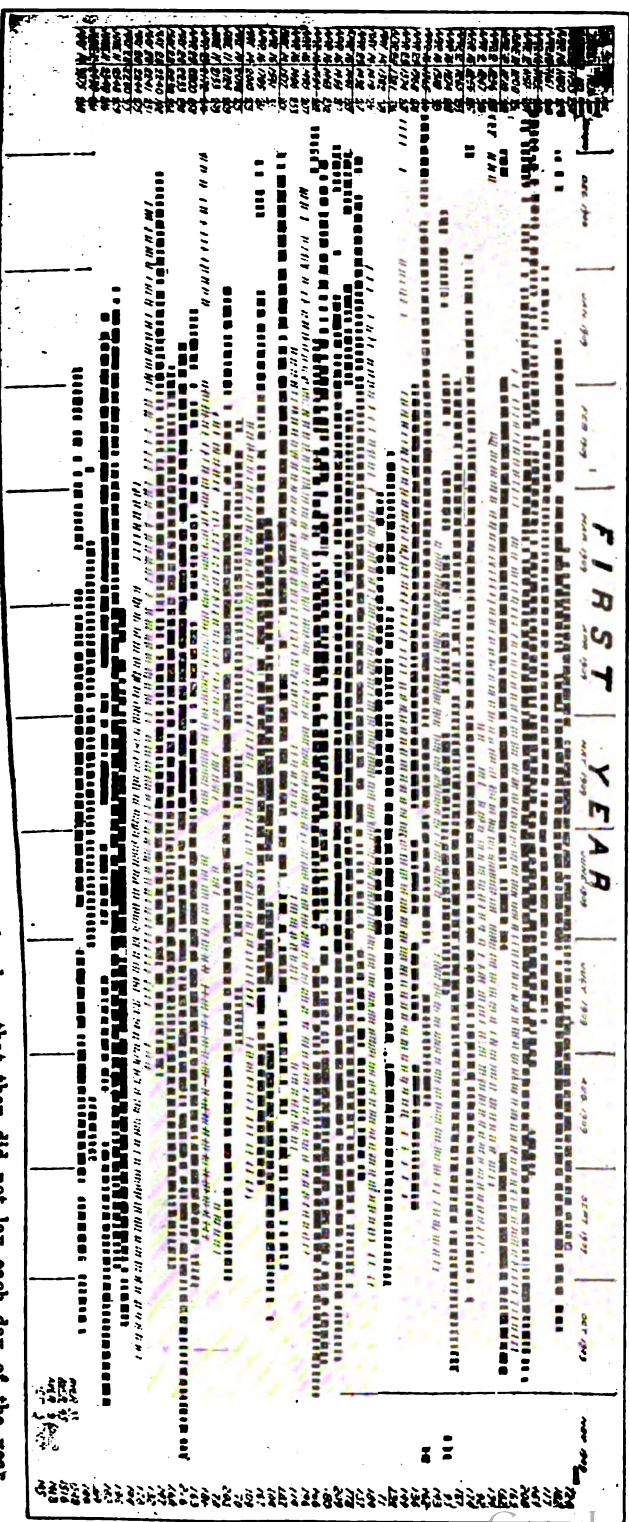


Fig. 24. The first year production of 45 hens, showing the days that they laid and the days that they did not lay each day of the year. Observe how the production increased after the month of December and ceased after the month of September in the case of most of the fowls. It will be seen that usually the birds that began earliest to lay continued to lay latest the following year.

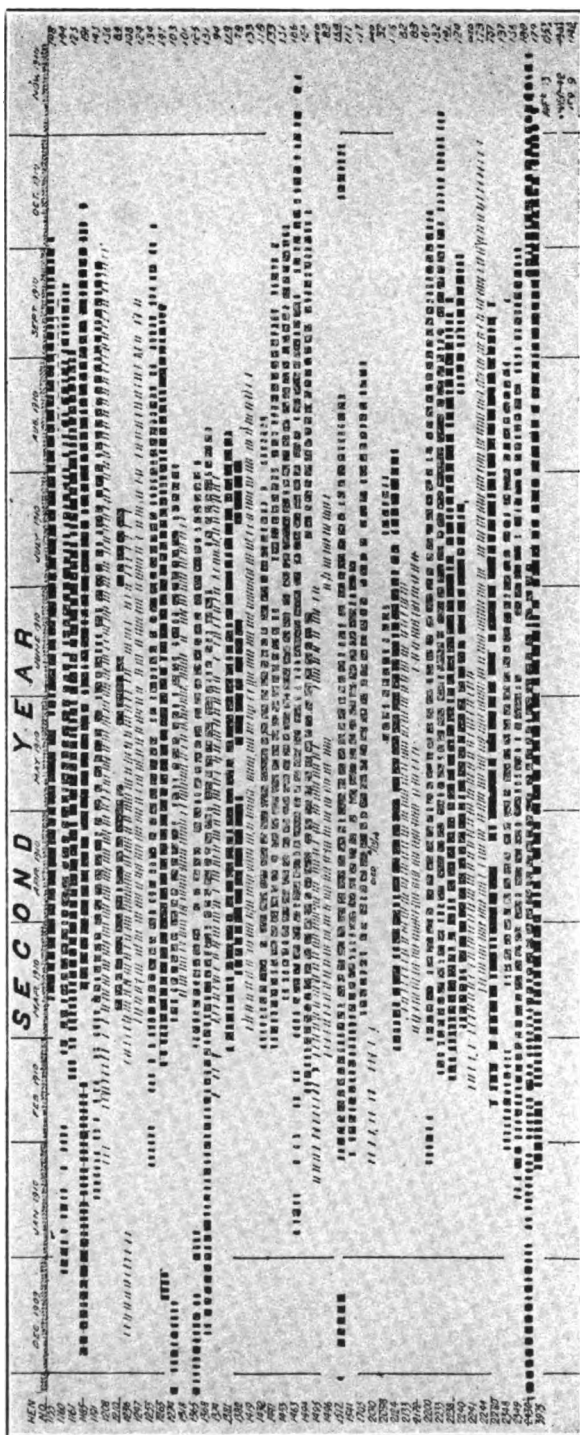
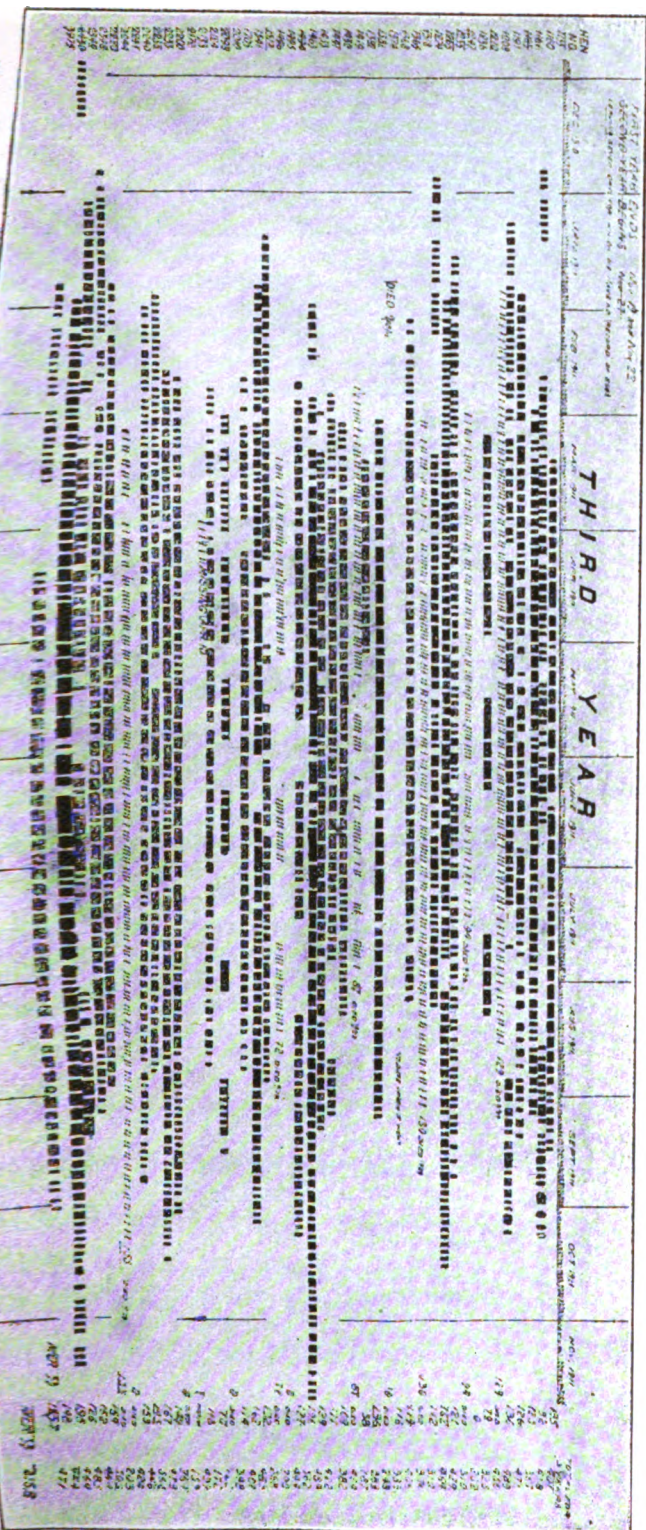


Fig. 25. The daily production of the same 38 hens shown in Figure 24. Observe how much later the birds began to lay, as a rule, in the second year and how much earlier they ceased laying at the end of the year.

Fig. 26. Third year production of the hens shown in Figures 24 and 25. Note a still greater tendency for the birds to begin to lay later in the fall or winter and cease to lay earlier the following fall, whereas, the production in each of the years maintains nearly the same intensity during the months of March, April, May and June. Note also the difference in the length of the periods when hens lay continuously without skip. Usually this is in the case of the better producing individuals, but not always.



years to test out the efficiency of these wind buffers. There is a little more glass put in the house to make up for the darker effect of the wind buffer in place of muslin. This picture (Fig. 23) gives a little better idea of the wind buffer, cut right down through to show the arrangement of baffle plates. You can see what the principle is; the wind, blowing from the front of the house, comes up and strikes that louver there and whirls, it comes up in here and whirls around over here and makes a counter-whirl so that it cannot get into this house until it has turned over several times and then reversed itself in the other direction. A person can stand two feet behind this wind buffer in the house with a heavy head of wind coming from the south and never know that the wind is blowing. The snow cannot get in, the rain cannot get in, but the air can change place through all the half inch or three quarters. The air circulates more freely than where muslin curtains are used; and that enables a person to put these wind baffles in the front of his house without ever having to touch them from fall to winter, and your hens are never in a draft and always have perfectly clean, fresh air if the proper proportion of the front of the house has the wind baffle construction. I know very well that I have long since exhausted your patience. I ought not to have brought so many lantern slides with me nor talked so long to each slide. I apologize, and thank you very sincerely for your attention.

MR. CAMPBELL: We have tried to arrange a little entertainment for the afternoon, weather permitting, and at two o'clock promptly the machines will be at the Hotel Conneaut to take the delegates out to Mr. Holcomb's farm, a mile or a little more south of here, and we want you all to go. We have not been able to get enough machines to take you all at once, and the machines may have to make several trips, but be ready to go when the machines are there and at four o'clock the Conneaut Lake Navigation Co. will have their steamer at the dock to take you on a trip around the Lake. Remember the time, because the boat will be there and you will have to start promptly in order to get back and be ready for supper. Any delegates can get badges here if they haven't got them.

A Member: How about submarines?

MR. CAMPBELL: We are the mine sweepers, we are taking the mines out and we are doing our best to insure your lives. You will have to take chances.

The CHAIRMAN: The next speaker will be Mr. W. Theo Wittman, who will speak on "Forty Popular Varieties of Poultry."

Mr. Wittman's address is as follows:

FORTY POPULAR VARIETIES OF POULTRY

W. THEO. WITTMAN, *Allentown, Pa.*

Mr. Chairman, Ladies and Gentlemen: I am not at all disappointed nor do I feel at all bad that Prof. Rice has taken so much time. We poultry people at least give credit to Prof. Rice's standing head and shoulders above everybody else in this country in his knowledge of poultry, and I am particularly pleased that he has had the chance to give us all or at least part of what he knows here this morning. I am especially pleased that he has given us agricultural workers of this State a message to take back home that the farmers of the State of Pennsylvania should quit having so many late hatched chickens. You know quite a number of farmers in Pennsylvania are just beginning to think of setting hens or just beginning to have their first chickens, and here it is nearly June 1. I am very glad that he has shown us here on this screen that 60 eggs is a very low egg yield, and I am sorry that the farmers of the State of Pennsylvania showed in the census enumeration of 1910 that their hens laid only 68 eggs. Take that message back home so that in 1920 the farmers can give a better report to the census enumerators. I am especially pleased that he brought the message. We want pure bred chickens, and it is a shame that in Pennsylvania some of our fine farms are disfigured and brought down in mine and everybody else's estimation by the sort of mongrel chickens they have on their farms. I am very glad he has said this and a great many other things, and I hope that we agricultural workers will go home and be a nucleus in our own neighborhood and will set an example and that we ourselves will not have hatched mongrel chickens and will not kill the early moulters and things like that.

This morning I am going to try to tell you which is the best chicken. Those of you who heard me talk know that I have always evaded that question, for a good many reasons. First of all, perhaps, because of my position as a worker, knowing the prejudices a great many people have on a particular question. As an officer of the American Poultry Association, I have tried to be as loyal to their standard as I could. I have evaded the question perhaps, because I am a licensed poultry killer and because I am manager of one of the largest poultry shows in America. But this morning I am going to try and forget all that, and directly and individually, as I feel to-day, tell which is the best chicken or which is the best variety of poultry to keep; or, rather, I am going to try to help you so that you can tell which is the best.

Now we are going to show some slides, not very many. The program says "Forty Varieties of Poultry." I'm going to tell you, "Forty Varieties" came about something like this: Several years back the American Poultry Association for the first time voted

quite a large sum of money that the different forty most popular varieties of poultry might be shown in lantern slides. It seemed to be very hard to find some firm that could make those pictures. Then the cry went up as to which were to be the forty. So a little later the American Poultry Association decided that all the standard varieties, something over a hundred, were to be shown like this. At last they are ready to do this. We have tried all the big slide makers of the United States, and you are going to see on the screen here this morning slides made by Williams, Brown and Earle, of Philadelphia and the Horace MacFarland Co., of Harrisburg. You are going to see some slides made by firms in Chicago, Boston and New York, and this is the very best they could do. I am sorry to say they are not up to type; in other words, the new standard, the 1915 standard, containing the illustrations of the very latest types of chickens is not out, and on account of the copyright law, we cannot show the newer type until the book itself is in circulation; but we will be ready to do that by the time of the World's Fair in November—I mean the poultry show in November, and they will be shown there for the first time.

These pictures I am showing here this morning are samples. There are going to be two kinds of chickens here; you had a hint that there are going to be two kinds of Barred Rock. I am going to show, first of all, the standard types, the type that the chicken fancier is trying to get, the type that is winning in the show room, not only the type but the color, and here we have the most popular chicken in America so far as the farmer is concerned, or at least the chicken that was the most popular chicken on the farms of Pennsylvania, the Barred Plymouth Rock. The fancier of Barred Plymouth Rock has had one thing in view, to get a peculiar shade of color and have his male and female alike in color; if you will stop a moment, you will remember that your males are a good deal lighter in color than your females and there are very few that have the markings of these particular chickens. You will notice a bluish cast, the feathers are pure black and white but are so distributed that the effect is a bluish pink. There has been endless time, patience and money spent in developing these fancy points. We have men in America who are known the world over, our Hawkins' and our Thompson and our Bradley and Wells, men whose names practically everybody in the room has heard, that have spent their lifetime in developing this Barred Plymouth Rock and bringing out these fine lines, and they go down to Madison Square Garden and fight the old battle over year by year as to supremacy, to see who can bring birds with the most parallel bars. Those bars on those feathers had to be parallel, straight across, so that we can have these ringlet effects. Those who have not been poultry fanciers have no idea what is required along the breeding line to bring about something like this.

We want to give due credit to the men who have been able, as a result of spending a lifetime of the keenest sort of work to be able to show this sort of chicken. It is not easy. I have knocked around the show rooms pretty nearly all my life; I remember the very first chicken I showed, when I was only a boy of ten, but

it was a mighty fine chicken, I thought. I paid a dollar to enter it in the poultry show, my own dollar too, and the judge came along and disqualified it; I didn't even have a run for my money, and when I was 17 somebody thought I knew enough about chickens to judge my first poultry shows and he went to the president of our county fair and got me a job and I appeared and introduced myself to the secretary and he asked me to repeat what I'd say; he was polite enough not to say anything more, but when I got out into the hall one of the men, when told I was to judge chickens, said, "That fellow is only a kid," and since that I have heard more than once that I don't know anything at all about chickens and I guess it is true, but I have been through that hard knock school of experience in judging poultry and I know what it is to get birds of this type.

Understand when men are breeding chickens, to get this type, they may have it on paper or they may tell it by word of mouth that this sort of chicken lays eggs, but they really don't care whether a hen like that lays one egg or a hundred, and they will breed her whether she does or not, and they will use the progeny from that sort of hen again and again, and it would be foolish if they didn't do it. A Barred Plymouth Rock like these, I have seen sold for \$100, \$200, \$500 and \$800, and if a chicken like that is worth \$800 and lays only 8 or 9 eggs a year, her eggs are worth some money. But I am not quarreling with those fellows who claim that that is the sort of chicken the farmers and utility poultry men should have and sell their eggs from this sort of chicken to the farmer and men who try to make a living out of their chickens. Within a month I was with a city man whose health has broken down and he bought a Pennsylvania farm nine years ago. The girls are off at work, but the boy is 16 and is going to school. The father is trying to pay the mortgage and the mother and the boy are trying to help with chickens. Four years ago they bought some chickens from one of these chicken fanciers, these purely fancy chickens. He brought these chickens to his Pennsylvania farm; they are low in vitality, they have never paid, they have simply lost their money. Why, to my notion it is a crime for any man, for any chicken fancier to sell that sort of chicken to that sort of person. It is not fair, and I do wish the chicken fancier, much as I respect him—it is a profession that I belonged to for many years—I wish he would quit that, quit fooling our Pennsylvania farmers and our people who are trying to make good with their chickens.

Now notice the difference; this is a work-a-day hen, a Pennsylvania hen. This is the hen whose mother and grandmother and great-grandmother and great-great-grandmother has been bred for egg producing. This is a hen that laid 283 eggs. This is a hen that could not win in any poultry show in the United States. You can compare the two types; one is a show lady and the other a work lady; you see the difference; feathers is everything here; the ability to lay eggs is everything with the other hen. This man had only one thing in view, to see how beautiful, how exquisite he could get his chickens, and just as long as there are men and women that love the beautiful flowers and beautiful painting, just so long there

will be men and women who will love the beautiful chickens and just so long will there be poultry fanciers, but most of us I am afraid want the other kind of hen.

There is quite a difference in type in these Barred Plymouth Rocks. The owner of this hen—and he is a Pennsylvania man and a well known breeder—will tell you if you ask him to describe in a word this chicken, he will tell you that she is a Leghornized Barred Plymouth Rock. That is his description. I think you all get what I am talking about. I fear that the chicken fancier has made of his Barred Plymouth Rock a member of the “pound” family; it is not usual to find in other types of Barred Plymouth Rock birds weighing 8 or 9 or 10 pounds, but if the Barred Plymouth Rock is to be a worker and a layer, it will have to be reduced something in weight. Now we have some White Leghorns. I was talking of Barred Plymouth Rocks and the emphasis we put on Barred Plymouth Rocks and how many men had been working at it, and the same is true of White Leghorns, only a New York man was able to outstrip everybody else and his name is known the world round, and to-day it is simply impossible to win anywhere in any poultry show in the United States of America unless you have this man’s White Leghorn. A great many in the room know whom I am talking about. This man has had a wonderful income the last few years because he created this kind of chicken. This sort of chicken is the result of many, many years of very faithful and very enthusiastic labor, because he will talk chickens from morning to night and then some. He gave up a wonderful position so that he could devote all his time to chickens. He has given us this elegant, stylish, beautiful White Leghorn, and everybody who admires the beautiful, it seems to me, cannot help but admire that bird; everything is a curve; the beautiful head, the style, everything that we think is exquisite in chickens is embodied in that type of White Leghorn; but again I fear that this is not a workaday chicken; in fact I know it to be true, I know it to be a fact, that if you ask the man who produced this chicken why it is that his chickens lay so few eggs, when you get him down in a corner all by himself, why these chickens lay so few eggs, he will tell you that the original mother hen laid that sort of an egg.

Now we have a different kind of Leghorn in the last few years. and I am sorry she is not the Pennsylvania Leghorn and not the United States Leghorn either; she is an English Leghorn. Now I don’t know why it is that the English Leghorns lay better than the American, but I guess they do; it seems to me they do. Every large commercial egg farm, if they don’t have some English blood already or don’t have their large flock English, are thinking of doing it, with one exception—I only know one large farm in Pennsylvania that does not want English Leghorns. If there is any reason why these English Leghorns lay better than our show type of American Leghorn, it is because of something we heard so much about this morning, vitality. I was in a large brood house in Pennsylvania where there were 12,000 chickens, 2,000 English White Leghorns, and I believe I would have undertaken the task of picking them out nearly to the last one as two year old chickens already. You can pick out the English White Leghorn. It never droops its wings, it is a strong, vigorous chicken. These chickens were grown

on Pennsylvania soil; their parents were English Leghorns; they belong to a farm down in Lancaster county and were imported. They are five chickens that came very close to winning the last North American Egg Competition. They stood second. There were 50 or 60 of those chickens down on that farm, and it would be very difficult to get 100 chickens that would each lay 200 eggs in some one year. I believe you could pick out a lot down there that were full sisters to those chickens. Every one laid considerably over 200 eggs. They are magnificent so far as vigor and vitality and ability to lay eggs is concerned. I don't know whether you think this is the prettiest, because I showed birds similar to the other five at the Pittsburgh Poultry Show, the largest in Pennsylvania, this last year. I mean the best attended. There was five of those birds there. There was a long aisle of this kind; there was 10 people looking at the other kind where there was one looking at this; in fact this aisle having this sort of White Leghorn, seemed to be deserted, but the aisle with the other five had a crowd, in fact finally the Superintendent of the show insisted that they be moved because they were blocking the aisle; and time and again people came to me and said that of the two the other was the prettiest. Now this is our idea, the chicken fancier's idea, of beauty, and we leave it to the audience to say which is the prettiest, the workaday or the show type of White Leghorn. There is a terrific difference between the two; we have almost a different variety of chicken; you would hardly think they were the same variety of chicken.

Now, because the time is short, I am going to hurry on to the next breed, the White Wyandotte. This is the show type of White Wyandotte. These are Pennsylvania chickens; they are not the present standards but will give you a pretty good idea of what the breed of White Wyandottes are. That is the trouble, the slide makers don't get all the details, because they don't know chickens; they should have put deep yellow legs on there. But anyhow, that is the show type of White Wyandottes. We want a very deep broad, blocky bird. These chickens are almost as broad as they are long. The breast is very full, very abundant. This White Wyandotte, if plucked, would have a blocky body. Notice the fine comb and the refinement of type that you see everywhere; that is the fancier's idea of what constitutes a White Wyandotte. Now let's have the other kind, the workaday White Wyandotte. Those of you who are interested in egg competitions, remember the late North American egg competition and that for once the White Wyandottes beat the Leghorns, and this is the sort they were; you will notice the long body; in fact they are Leghornized White Wyandottes. The editor of one of our farm papers said they were simply White Leghorns. That is not quite true, but it is almost true. They have the narrow back; you see what a difference, instead of that great big wide back they have a narrow back; in fact we again almost have a new breed. This is the workaday White Leghorn. It is up to you again to say which is the prettier.

It seems that the American Poultry Association up to this time has made their standard—well, if you will tell me who makes women's fashions, I will tell you who makes the American standard of perfection. I don't know; it is simply a fad or a fancy, a changing fad or fancy not based on anything solid or substantial. Some-

times the American standard of some certain variety is simply based on a fad of one man, one fancier. I shouldn't have any quarrel with that, it put more money in my pocket at a certain period than any other chance of making money I ever had, but I don't think it is quite fair, when we come to sell this kind of chicken to the man who wants to get dozens of eggs or pounds of meat.

Now we have the laying type of White Wyandotte in this chicken. Notice the very large, high comb on two or three of these hens, almost lop combs, they were so large they would drop over. I am proud of the fact that Pennsylvania poultry people have been exceedingly liberal the last year in giving up their good dollars to get these good layers, it didn't matter who owned the birds or where they came from. They got the best they could buy, and these chickens we are looking at are to-day on Pennsylvania poultry farms and have high records as layers.

We have here Rhode Islands Reds. Now when I said that the Barred Plymouth Rock was the most popular chicken on the farms of Pennsylvania, I am afraid that to-day this other breed is leading and is slowly but surely pushing the Barred Plymouth Rocks off the farms of Pennsylvania. I don't know why, except that perhaps this is a better chicken. I am only showing four varieties of chickens this morning; these four varieties practically cover what is really popular to-day in America, the Rocks, the Wyandottes, the Reds and the Leghorns. Take the Campfire—just two years ago everybody was buying Campfires. On one farm I visited this season, the five first prize Madison Garden winners are not found at all. The general public seems to have simmered down to these four varieties. The farmer seems to like this Red. I don't know why the Red is good except that the American Poultry Association has done less to spoil the Red as a utility bird than any other breed. The Barred Plymouth Rock, to get the colors I was showing you, we have three distinct breeds, a controlling and pullet line. A certain line of chickens we breed together, male and female, to give the female a certain shade and color and then bring the two together. The one big stumbling block in the way is to get this color, and the slide makers have not been able as yet to get the correct shade of color in Rhode Island Reds, but this gives you some approximate idea of what constitutes color in Rhode Island Reds, one even beautiful red color. Now let us have the workaday Rhode Island Red. There is quite a difference. You at once notice that the man breeding these chickens did not pay so much attention to color; it was the ability to lay eggs, and again you notice something outstanding in these five hens; what is it? Vitality. Don't those chickens look as if they were really alive? And they are. I have had the chance to watch them a great many times and look them over and they are that way on the Pennsylvania farms; they are alive from start to finish, and is there any wonder they are beating the others in laying eggs. The reason is because they are alive and because the men who own them have been careful to look after vitality and vigor, so far as breed is concerned. I intended to say a whole lot more about these different grades, but unless you want to ask a question or two, I shall stop right here.

I have given little hints of what the general public has found to be best, and you will be pretty nearly safe in following these four breeds and not getting outside of them if you want to get the best chickens.

The meeting then adjourned until 7.30 P. M.

Wednesday, May 26, 7.30 P. M.

Mr. Archie Billings in the Chair:—

The CHAIRMAN: The first thing on the program to-night is the quartet.

MR. KILLAM: By your permission, Mr. Chairman, I would like to present the report of the Resolutions Committee, before they vocalize very much; I don't think that vocalizing will be very entertaining to this crowd anyhow.

Mr. Killam then presented the following resolutions:

REPORT OF COMMITTEE ON RESOLUTIONS

RESOLVED, That we, the Resolution Committee, appointed at the Spring meeting of the Farmers' Annual Normal Institute, held at Exposition Park, Pa., May 25th to 27th inclusive, do this the 26th day of May, 1915, report as follows:

First, Your committee, at the call of the Chairman met at 10:30 A. M. at the Hotel Conneaut and desires to present the following resolutions:

RESOLVED, That we extend our sincere thanks and appreciation to Hon. James E. Reany, Hon. R. C. McMaster, Messrs. H. O. Holcomb, J. T. Campbell, W. F. Throop and others for kind and courteous treatment extended to us while in their midst, and commend the action of the State Board of Agriculture for selecting this beautiful park for the place of meeting.

RESOLVED, That we deplore the departure from this life of our honored co-worker, Mr. M. M. Naginey, of Milroy, Pa., who so faithfully carried on the Institute work in Mifflin county, and express our sincere sympathy to his bereaved family.

RESOLVED, That we express our appreciation for the efforts of Governor Brumbaugh, in conjunction with the last Legislature, for the interest taken in the Department of Agriculture and its appropriations; at the same time regretting that the finances of the State

will not permit a larger appropriation, knowing, as we do, the necessity thereof for greater advancement of the Advisory Work and Farmers' Institutes now being carried on so efficiently throughout the State.

RESOLVED, That we commend the excellent work done by the retiring Secretary of Agriculture, the Hon. N. B. Critchfield, who has been foremost in the advancement of our work.

WHEREAS, Being mindful of the fact that for sixteen years, Hon. A. L. Martin has been at the head of the Farmers' Institute work of the Commonwealth, and because of his ability as an organizer, and his co-operation with all of the educational forces of the State, he has established and developed an institute system that is admittedly excelled by no other state in the Union.

THEREFORE BE IT RESOLVED, That we extend to him our sincere thanks and commend him for his excellent and fairminded discharge of his official duties.

B. F. KILLAM,
S. C. GEORGE,
W. F. BIDDLE,
WM. M. PATTON,
E. L. PHILLIPS,
J. E. HILDEBRANT,
L. W. LIGHTY,
Resolution Committee.

MR. KILLAM: There were some suggestions offered to the Committee but they didn't take them up and we thought maybe they would be disposed of in that resolution and report.

The **CHAIRMAN**: You have heard the reading of the resolutions. What is your pleasure in regard to the matter?

REV. B. M. POSTEN: I wish to present this resolution, which I have shown to several:

"Realizing the important part real religion plays in the farmer's permanent success, therefore, be it resolved that the farmers of the State be urged to give greater consideration to the importance of the country church, and that the authorities of the different denominations be asked to give greater efficiency to the men who are asked to perform this task as pastors by giving them an agricultural education."

The **CHAIRMAN**: Do you wish to take action on the resolutions as read?

MR. KILLAM: I move you, Mr. Chairman, that that resolution be added as a part of the resolutions already read, and embodied therein.

Motion seconded and adopted.

MR. BLYHOLDER: I move the adoption of the resolutions, as a whole, as read by the Committee.

Motion seconded and adopted.

The CHAIRMAN: If there is nothing further, we will take up the regular program of the evening and will now listen to our quartet.

The quartet then sang "My Bonnie Lies Over the Ocean," which was received with applause.

The CHAIRMAN: Our first topic for this evening is "The Draft Breeds of Horses," by Dr. Carl W. Gay, of the University of Pennsylvania, Pa. It affords me much pleasure to introduce Dr. Gay who will address you.

Dr. Gay's paper is as follows:

THE DRAFT BREEDS OF HORSES

DR. CARL W. GAY, *University of Pennsylvania, Philadelphia, Pa.*

Ladies and Gentlemen: I am a little disappointed because the quartet didn't sing, "A Hot Time;" I believe that would be more appropriate than the song they rendered. We are having rather a cool reception to-night, and if you become too much congealed and will indicate that fact, I will close at any time.

You may wonder whether or not it is worth while to devote a place on this program to the discussion of horses. I don't know anything in the way of farm products at the present time about which there is any more question than the production of horses. I do not propose to take up the answer to that question, because we haven't time; I can merely emphasize two facts. In the first place, I admit that the horse market did not recover this spring as a great many of us thought and believed it would. That, however, was not the fault of the horses nor of the men behind the horses. You know if you go by the market quotations as a criterion of the standing of horses as a farm product to-day, you will be somewhat discouraged. It is a fact that the horse market is off, but it is not very hard to determine the cause. If you go to the city or simply read the papers, you know there is a certain amount of business stagnation still; concerns that have been working a hundred horses perhaps are only working sixty; they not only are not going to keep up their full quota of a hundred, but they may have turned that extra forty on the market, so there is a practical glut on the market and very little doing in the purchase of high class stock of horses, but the reason is easy of explanation—simply there is not the demand for horses and we firmly believe that with the return of normal business conditions and traffic,

etc., incident to normal business activity, the horse will come back to his own. I can further assure you that those who know the situation best and have an opportunity to follow it into the future, are still pinning their faith to horses, so there is no reason why we should feel any discouragement, and no reason why the horse should not have consideration on the program the same as other farm products.

You may also wonder what can be said about the draft breeds that has not already been said, this being a very familiar topic. It is my purpose, however, to discuss these breeds from a little different angle. My object is to induce you, if possible, to study the breeds with which you are engaged with a view of making out what you can learn of their history, what possibilities may lie before them in the future; that is, we can foretell best about those things of which we can learn the most in history. I don't know of any line of business where a man starts out with as little foreknowledge as in the breeding of pure bred livestock. I do not mean now simply the principles of breeding. A man may know all about the principles of breeding and may be an authority on heredity and principles of that sort, yet if he does not study the history of the breed itself with which he expects to engage, he is very much in the dark as to what he is doing and what can be done. Therefore, I would like to take up the breeds of draft horses. We have to limit our subject and limit it to them, and I would like to take up the breeds of draft horses with a view of bringing out from a consideration of their history, what is inherent in them and how, by a knowledge of their inherent characteristics, we are better able to get the best out of them. It seems to me that this is especially essential.

I am going to show you some statistics a little later; I am not going to burden you with them, but I have one slide that will show what a dearth of pure bred stallions we have available for the breeders in this State, or the country for that matter. This State is a little worse off than some other states, and is better off than others, but there is a dearth of pure bred stallions available to the breeders. If this is the case, doesn't it behoove us to make the most use of the blood available and the most judicious use—make the most of it? And it is with that in view that I propose to discuss the draft breeds.

In the first place, what is a breed? I say a great many men are breeding pure bred stock, and yet I believe I am safe in saying that they don't know exactly what they are dealing with and it will throw a great deal of light on some of the results they get if they will just inquire and find out a little more about this thing they are dealing with. They do not realize that they have the embodiment of an hereditary force placed in their hands, and unless they know the extent of that force, the characteristics carried on by that force, they can accomplish very little in its direction. For instance, a breeder of Angus cattle is very much disheartened, and perhaps thinks somebody has put over a counterfeit pedigree on him when he has bought a bull and gets a red calf. I have known Angus breeders to become very much incensed because out of their pure bred, as they supposed, black cattle, there is all of a sudden a

red calf born. If a man knows anything about the history of Angus cattle, he knows that the occurrence of a red calf now and then is perfectly normal and does not cast any reflection upon the stock he is working with. In the same way a man dealing with Berkshire hogs perhaps notices a sandy tint in some of his pigs and is disposed to think that someone has sold him as pure bred Berkshire, hogs that were not pure bred. He does not know that at the earliest time in their history, the pure bred Berkshires were red and the recurrence of this is a perfectly normal thing. Another man sees black spots on the ears of his Leicester rams and begins to doubt the purity of their blood, and yet if he will go back in history, he will find that the man who founded the breed used as the most potent element in his flock a black ram and it is perfectly natural to expect black spots on the ears of Leicester rams. That gives you some illustration of what I have in mind about being able to account for things that happen and able to plan for things that have not yet happened but which can be brought about by the intelligent use of this blood.

We have J. H. Sanders' definition of a breed—it is a group of individuals possessing distinctive characteristics, (and I would like to emphasize the distinctive characteristics) not common to other members of the species. It makes a breed the division of a species just the same as the species is a division of a genus, and the second part is that these distinctive characteristics must be so firmly fixed as to be uniformly transmitted. We have a great many groups of individuals that possess distinctive characteristics not common to other members of the species, and yet those do not constitute breed groups for the simple reason that those characteristics are not sufficiently fixed to be transmitted. We could refer to a great many cross breeds. You take the cross breed and we can produce in poultry certain plumage conditions with a high degree of regularity by certain hybridizing processes, and yet you cannot take the cross breeds and get any distinctive results. In the same way the cross bred bullock in England and Scotland is produced with great regularity; blue-gray is produced by the mating of Newfoundland White Shorthorns and Angus Galloways, yet they have not qualified as a breed. As you study breed history, you find that some breeds have passed through an evolutionary period. Take the Oxford breed of sheep; it is a composite breed, almost a cross breed, the blending of two distinct types. Up to a certain time, those cross breeds would not breed with any degree of uniformity. The cross breeds themselves fulfill the first half of our breed requirements; they possess distinctive characteristics but they would not transmit them always until the breed had been so intensified that they would finally breed with a high degree of uniformity. The Oxford was accepted as a breed and classes made for it at the shows; that is what a breed is.

The thing I wanted to emphasize most about this definition is the distinctive character, and to them I want to call your attention. I have heard men say on several occasions that, to confine my remarks now to draft horses, that they would not breed to anything but horses of a certain breed in that same breed, and I have heard other men just as positively say that they would not breed to a

horse of a particular breed under any circumstances. Now that is the kind of breed sentiments that I would like to break down. Partisan spirit is a good thing, competition makes for healthy rivalry that gets good results. But when a man is so partisan that he will take a position of that sort, he is not an intelligent, constructive breeder and he has missed the fundamental essential; and that is what I am trying to emphasize. On the other hand I have heard men say that breed didn't count very much, didn't figure much with them, they wanted to breed to the good horse. Now there are good horses in every breed, and that man's position is much more tenable than the position of the other two men, unless it be qualified by certain local conditions which affect the different breeds. I would always rather breed to the best horse, irrespective of his breed, than take a stand that I would not breed to a horse of one breed or to a horse of any other breed.

What are the distinctive characters, which are the things that distinguish one group from another, the result of certain agencies that have been transmitted in the history of the breed and which they themselves are going to transmit to future generations of this breed? They are the things that have to work out of the breed; they are working out to produce a certain class of market horses. The buyer, nine times out of ten, pays no attention to breed, he buys on contract, he has certain specifications to meet. Maybe when he gets his carload of horses together, you and I who know breed will go over them and say they are all Belgians or Percherons. How does it happen that they are so uniform? Because he has been after a certain type of horse and the specifications he was trying to meet have been the specifications that were most in line with the distinctive characters of this particular breed, and as a natural matter of course, the horses he got together will be of that breed; nine times out of ten that is about as much a figure as breed cuts with the ordinary buyer. But say we want to fulfill a contract or a near market demands a certain kind of horse and we are laying our lines to produce it in the future; that is the time to look at the breed in a non-partisan intelligent way.

There are certain horse characteristics we want to produce in future generations and you cannot get anything out of a breed that has not been put there any more than you can get an element of plant food out of your soil that has not been put there if it was not there in the beginning; and yet I have known lots of horse breeders who were endeavoring to get something out of their breed of horses that had never been put there and the reason they did it was that they did not know what had been put in and, therefore, did not know what they could get out and were getting a good many things they did not expect and could not account for and were failing to get a good many things they had set out to get. Now I say that the distinctive characters are the result of definite agencies that have been operating all down through the history of this breed, and you can put them in three groups: First, everything that comes in the line of foundation stock, original blood. Some breeds owe almost all their distinctive characters to the blood on which that breed was founded. The original stock has been very little altered as it has been bred on down in generation after generation. In the second place, we may have the operation of

environment so that the characteristics of that original stock have been almost completely lost and new ones introduced either in whole or in part through the influence of environment; and then third, and I think most important of all, and of course involving the other two to a certain extent, is selection. The purpose of the breeder, the ideal of the breeder, the standard that he has had in mind all through these different generations, during which he has been moulding and creating new forms and types.

Now I will show you two pictures a little later of representatives of two breeds, and I think the whole difference between them can be accounted for in that way, it is the main factor. They are practically identical in blood, so far as the foundation is concerned; there has been no admixture in either breed of recent date and comparatively little difference in their environment, and yet to-day they are as unlike as two different horses can be, and the reason for that unlikeness is the fact that the breeders of one breed have had one ideal of what a draft horse ought to be and the breeders of the other breed, another idea; so these are the agencies that have operated, and as we work with our breeds, let us bear this in mind, let us remember that that horse is not an individual; that is an important thing to remember.

When we study the individual, the first thing to take into consideration is whether or not he is a representative of his race. The man who says he would not breed to anything but a Percheron horse, may find the only Percheron horse available a very inferior individual, while there may be available a Belgian horse that stands away up as a representative of his breed, and yet a man will tell me he would not go to that horse because he is a Belgian. The first thing to consider is whether or not the individuals available to us are representatives of their race, because the individual, male or female, does not transmit merely his or her own characteristics but all the characteristics of their ancestors. Now if they are better than the average of their ancestors, you know what the effect on the offspring will be—their colts won't be as good as they are. Why? Because their ancestry is pulling them down, they have shot ahead of their ancestry a little bit, and yet there is the drag of the race pulling them back to this common level; the average of the offspring always represents the average of the ancestors; if you have just an average individual, he represents the average of his race and you are safe in assuming that the average of his get will be just about like him. If you have got an individual that stands away higher than the average of his breed, then you can hardly expect his colt to be as good as he is. If, on the other hand, you have an individual away below the average of his race and he is pure bred and has strong limbed, fast ancestors behind him, you may expect those ancestors to help boost his offspring up to a little higher level than he himself is.

A Member: Can you say a word about the Mendel Law.

DR. GAY: Well now, Mendel's Law has not been demonstrated very clearly yet on horses. Mendel's Law has thrown a lot more light on the subject of plant breeding and the breeding of rabbits and guinea pigs than on horses and cattle; they have demonstrated that the color of horses comes under Mendel's Law and the horn and whole character of cattle comes under Mendel's Law.

A Member: It doesn't run clear through?

DR. GAY: No, it does not hold in all cases, and we don't know yet in which cases it holds and in which it does not; it is a pretty deep subject to attempt. The thing to consider then is whether or not we have an average individual and bear in mind that that horse is transmitting, not his own character but the character of his ancestors behind him.

A Member: We have a black mare that has a bay colt, just like, in shape and color, the dam of the sire.

DR. GAY: Well, now, when you get into color in horses, you have got a very wide range of variation to deal with, in the first place, and almost any color will come along. But this much has been proven; the experiment station has issued a bulletin; Mr. A. B. Cox, a breeder of trotters in Philadelphia, has given a great deal of study to this thing and has also done some work along this line and has demonstrated the recessive and dominant character under Mendel's Law that a chestnut color is recessive, and any time you breed a chestnut horse to a chestnut horse, you get a pure chestnut. If you breed a roan to any other color, in nine times out of ten you get a roan. Old Jaybird proves that; two or three generations removed from Old Jaybird, he is a roan because roan is a dominant character and blocks out the other. What I want to impress on you is the fact that we cannot find out all the characters inherent in the individual by looking at him; he does not manifest in his physical make-up everything he has inherited from his ancestors; he only inherits the characters that are dominant and has a lot of recessive characters, yet he will transmit them just as regularly to his offspring as the characters he himself manifests. How are you going to know, unless you should study their ancestry and see what the foundation blood was and how much it has been modified and see what the breeder himself has had to do not only in improving but in shaping the type?

My purpose to-night is to show you representatives of the four great draft breeds and to try to point out in those representatives the distinctive characters that each breed possesses by virtue of one or more of the three agencies; and then lead you to see, on account of the fact that he possesses those distinctive characters as a matter of natural consequence in heredity, those are the characters he must be expected to transmit. I am not talking about pure breeds except from the sire's point of view; I am talking about the parentage of your pure bred farm horse with your farm mares for market geldings. The first slide I will show you has a lot of statistics which I won't expect you to remember, but there are two or three things. In the first place, it shows the position of Pennsylvania as a horse breeding state. The ten leading horse breeding states are arranged in order. These figures have been compiled by Wayne Dinsmore, Secretary of the Percheron Society of America. Naturally they are colored a little stronger in Percheron figures, but nevertheless the figures don't lie, they are facts. In the first place, you notice what he says at the top, horse breeding shows improvement, the grades are decreasing and

pure bred sires are on the increase. That is generally true, but not of the whole country, especially in this State we have not increased very much in the total number of stallions licensed, but we have increased very materially in the number of pure breds in reference to the number of grades, and he finds that to be true all the way through.

The states are arranged here as they stand: Illinois first, Iowa second, etc. The main thing I wanted to point out here is, what I called your attention to in the first place, our dearth of pure bred sires. This table shows the number of horses; that means mares or gelding or anything else. Take the total census of the horses in the state, then take the census of pure bred sires in the state. Now Iowa is the lowest; in other words, it is the highest; they have 276 horses per pure bred sire; that is, for every 276 horses in the state they have a pure bred stallion. We have a pure bred stallion for every 880. I think, I am not sure, but I think it is very much lower than Iowa which shows you that we have, as I said in the first place, a dearth of pure bred sires and it behooves us to make the most of every one that we have. Now we say that a pure bred representative possesses distinctive characteristics not common to other members of the same species to which he belongs.

There is, however, one thing they possess in common; all the representatives of the breed must first of all be draft horses, Now the distinctive characteristics are over and above that, fundamental characteristics are, you will find that in all our breeds there is this fundamental characteristic; we have four great beef breeds, some are black, some red and white, some red and white and roan, but they are first of all beef breed cattle; we have four great dairy breeds; some are colored one way and some another, but every one of them is a dairy cow before she is anything else; and so it is in draft horses; they must first of all be draft horses. This is not only a representative of a breed but he is a representative of a draft horse, and I admit that a draft horse is not as much in order in this part of the State as in the east; that is, I mean by that we have to emphasize draft horses down there because the breeders don't know so much about the draft type. I know that Crawford and Mercer counties are the two great draft horse counties of this Commonwealth, so we don't have to explain a draft horse to the natives of this corner of the State; but down in our corner, they are brought up with a light legged horse in their minds. Here is a draft horse of standard weight close to 2,500 pounds and there is not an overgrown thing about him. You see he is low down and wide out; he is compact, he is deep, he has got the muscleing, he has the bone and if you could see him move, he has got the power in his way of going; he just looks as though he'd pull the corner out from under a house. So that in our draft horse standards, they must have the scale, they must have the substance; while this horse has some fetter there, he has a wonderful quantity of bone in addition to the fetter. You can see it is not beef that gives him his 2,400 lbs. weight, but the way he is made.

All those breeds must conform to the standard, first of all; some conform more closely than others; others depart a little bit from the extreme draft standard. While we have him on the screen, I will say that he is not only a draft horse but he represents the draftiest of all the draft breeds, namely, the Shire. This stallion sold for \$12,000 and is supposed to be the best Shire horse shown in this country, and he has won prizes in England before he came here. I have heard men say they wouldn't breed to a Shire. I would breed to a Shire; I would consider it a privilege to breed to this horse and would pay a good big fee to do it and buy a lot of horses of the other breeds to get to him if possible. The characteristics we want to seek in the Shire breed, that we get in the Shire breed, and we don't want to go to a Shire if we don't want those characteristics, are first of all, scale; there is no other horse that will average as great a weight as representatives of the Shire breed, or as much bone and substance and muscling as the Shire. There is no breed but one that will average as massive and drafty a body as the Shire. If we want those things we must go to the Shire to get them. But every breed has certain characteristics, characteristics not as desirable as those I have named, and it is as essential that a breeder shall know the undesirable characteristics as the desirable; and it is only when a breeder recognizes one as well as the other that he can begin to improve them along the desirable lines, but just as long as a man thinks the stock he is producing is all right, that man is going downhill instead of up, but it is the man all the time on the lookout for the little defects and trying to stop them who is the man that is all the time raising the standard and getting up.

Now grossness in size and quality do not go together; it is a good deal easier to get a pony well shaped than it is to get a horse that weighs 2,400 pounds. When we take his great weight and scale as fundamental, then we have got to make some concession and must expect him to be a little plainer perhaps in the head; although this horse is especially good in that respect, we have got to have some better. I learned that lesson in Crawford county and never have forgotten it. A man brought a Shire horse he had just bought to show to a number of us and he was a very ordinary looking two-year-old but did have pretty good bone. One man says "Why did you buy that colt?" He says, "I wanted bone." He was a very hairy legged horse and another man took exception to that hair, and another says, "You can't get bone without a bit of fetter." That happened to hit me and I have kept it in mind and made my observations along that line ever since. I admit that a nice clean legged horse looks better, but I am absolutely certain of the statement that you cannot get the bone without a certain amount of fetter, and rather than have the absence of bone and what goes with it, I'd get the fetter and get it fine. I don't want these great big shaggy legs, but nice fine fetter on a draft horse makes him look as if he had timber under him, and the draft horse men who know this and know the game best are the men who don't take that fetter off their legs, so you have got to expect a little grossness in a horse of this kind, you have got to look out and see that you get all bone and no quality otherwise. He is the horse that gives us our scale and draftiness and it has been demonstrated very well on the Chicago market that the highest class of geldings, as they run, especially

those that range around a ton, have got a dash of Shire in them, the majority on the dam side. James Johnson calls attention to the fact that a great deal of the credit that ought to be going to Shire horses because the Shire blood comes through the dam side is being given to Percheron and Belgian and Clydesdale horses because they happen to be the sires of these horses, and yet anybody can go back and read Shire blood that came through the dam side, and if we knew more about them, we would be attaching more importance to the Shire blood in their ancestors, so don't turn against a Shire simply because he is a Shire.

I will show you the pictures of two breeds that represent practically the same foundation stock and almost the same conditions of environment, but two extremely different ideals on the part of their breeders. Here is a representative Clydesdale. If you want scale, bone, extreme draftiness and all those things, don't go to the Clydesdale for it, the Scotchman's idea of the draft-horse is a horse that can go away with a straight, friction-less, springy stride with considerable length. That is fundamental to the draft horse. The Englishman's idea of a draft horse is grossness, hulk, bulk, scale, and he sacrifices anything else to get it. In order to get this straight stride that the Scotchman is so insistent upon, the horse would be longer legged to give him more freedom of stride and will have to have a little more range in body. Also, it won't be as thick, because, by the law of correlation a short horse, short in legs is short all over, and a long horse long in legs, is long all over, but he would rather have him a little narrow and go straight than have a wide front and roll as these great big massive horses do, and then he wants him to hit the ground in a springy fashion and go with his hocks under him and close together, therefore he has a hind leg that is set more accurately; there is more mechanical perfection in the hind leg of a Clyde horse than any other horse.

I will show you some grades gotten by horses of these different breeds, and from them you can gain some idea of how their hereditary characters are transmitted. Here is a great Clydesdale; this is not characteristic of the breed; some of the Clydes carry the slope of the pasterns to too great an extent. Here is a horse that stands a little low on his knees and he has a foot that is alleged to be representative of this breed, and the feature of his foot, the worst one, is the one that is usually mentioned last, but you see here that same lofty carriage of head and neck; the neck has some space to it, so there is place for a shoulder. We have a pair of Clydes here in harness, showing the same general character. See how they stand on their pasterns, how springy they are, how their hocks are close together how straight they are. That is a long length of neck they have got in front of the collar. A Scotch collar like that will cover up almost the neck of some draft horses, and you can see by the way they stand that they will go off in that snappy, springy easy stride that the Scotchman is so insistent upon. Here is a stallion of a breed more familiar to us. I don't know that you noticed it on Mr. Dinsmore's chart, but there are more Percheron horses in this country than all other breeds combined, and more in this State than all others; they outnumber the other breeds three to one, on an average. Of course that is the real reason why Mr. Dinsmore got together the figures I showed you first, but he introduced incidentally the other figures which meant more to us at the time. Here is a breed that

owes a lot to the foundation and I do not want to detract one bit from the credit that belongs to the Frenchman for the production of this almost universal draft horse; but on the other hand we must see in this horse certain characteristics that go right back to his foundation blood, and much less altered by man's tampering than in the case of the other two breeds I have shown you.

Here is a horse that has his foundation away back in early times, in the first place, in the so-called Flanders horse, a horse of cold blood, characterized by his bulk and coarseness, his black color, the amount of hair he develops on his legs, tufts at his knee, tufts at the point of his hocks and even a mustache at his lips; very slow and awkward in his movements. That was the foundation. On that top course, first, accidentally and afterward with malice aforethought, were made infusions of color through blood. The accidental way in which that occurred was in consequence of invasion back in the days of the Saracen invasion, the barbarians came north into France and were overpowered and their mounts, which were largely stallions, fell into the hands of the victors and were distributed among the French soldiers and taken back into the country and became the leaven in the horse stock of that country. The Crusaders accomplished the same thing, and after that, when the influence of this blood was demonstrated, systematic importations of oriental blood were made into France and while there are no oriental stallions close up in the pedigrees of our Percherons today, if you go back you will find they go back to Jean La Blanc. This horse has a finer breed of head than any draft horse, finer ears, a fuller, clearer eye, more sharp definition of features. We see it in his disposition and temperament. He is active, snappy. We see it in the character of his bones. The trouble with the Percheron bone, nine times out of ten, is that there is not enough of it, it is too fine, and we see it in the character of his hoof. He has got a hoof that comes from the hot blooded horse.

And, finally, what can he do. The Percheron horses are the most versatile, they can do the greatest variety of things, and there are a great variety of types running through them. The old fashioned Percheron horse is a general purpose horse. If you could see some of these old fashioned Percherons, or pictures of them, I think you would find your ideal for the general purpose horse, but when the demand came for bigger horses, they had to put more cold blood into this stock and bring up the size and scale, but they have done that very skillfully and have retained the features of the old oriental stock. So here is a breed that, while he owes a lot to the men who have bred him, we can still trace his ancestry in the general characteristics he manifests to us to-day.

Why is the Percheron horse more numerous in this country than all other breeds combined? Is it because he had the earliest start? No, it is because he made the first hit; he was the horse that the farmer took up as the one thing that suited him in the way of a horse, and from way back in 1851, the days of Louis Napoleon, until to-day, the Percheron horse has received the stamp of approval of the farmer. This is the reason—he is a versatile horse, he can do anything, and the Percheron stallion is just as versatile a breeder as the Percheron horse is a performer. You breed a Percheron stallion to almost any kind of a mare and you will get a market horse of some sort. If he is spotted with light hairs, he will make a

snappy, active draft horse; if lighter yet, he will make an express horse with a good long stride that can step away with a load. I have seen some half breed Percherons that could go up as high as any coach horse and I have seen some hunters that could endure as long as the hounds ran, and once in a while you will find a Percheron that can step better than a four minute lope. He is versatile, fits in all around, and that is the reason we find him so popular in this country. This is the little horse that has been spoken of so many times and is shown in another picture, in the lead of this type that I refer to. That shows you the ideal to be sought when mating mares to a Percheron stallion. I say he will get a marketable colt out of most any kind of a mare, but you want to give him a chance and give him the best kind of a mare and then you can expect to get something of this sort.

A Member: I observe in the cities that some of the better grades of Percherons are of a gray color; is there anything to show that the gray Percheron is a better horse than the black Percheron?

DR. GAY: Well, there is ample evidence to show that the gray Percheron geldings on the city streets is a lot better horse than the black. In the first place, there is no doubt that the gray horse does not feel the heat as much as a black horse does. Take a lot of soil, put lamp black on part of it and something white on the other part and stick a thermometer down on each one and see which registers the highest.

A Member: But you take a horse on the street that appears to walk along easier even at this time of the year, when the heat is not a factor.

DR. GAY: You take Wanamaker's stables in Philadelphia; they won't buy anything but a gray horse. That is one reason. Another reason is that they can match up their pairs. Take a bay horse and nine times out of ten it has a mark on him and especially if you are putting three or six together, and they blend better with the ordinary red and yellow or green color of a wagon on the street, and it is more easy to get an even shade of grays than any other color, and they want that uniform color throughout their stables and find they can get it more easily in grays than any other colors. Swift first told me that they pay \$25. or \$50. more any time for a gray horse than any other.

A Member: Some think that a gray stallion is better than a black stallion; is that a fact?

DR. GAY: They used to tell us that a black stallion would get more gray geldings out of the average run of mares than a gray stallion would, but I don't think that is so, I think the gray will get more, but on the streets certainly more favor is shown to a gray horse than a black one.

A Member: How did they get that increased size in Percherons for the last 24 years?

DR. GAY: By going back to more of the old Norman blood; they have increased the percentage of that, yet they have skillfully retained the characteristics of the hunt blood.

A Member: It is not quite the same tempered horse.

DR. GAY: He is a colder horse to-day than he was 25 years ago. There is no question about that, and it is only due to their care in selection that he is not colder than he is. There is a nice pair of farm horses that have won prizes in all parts of the country and show every evidence of Percheron breeding. Here is a horse that has won prize after prize at Philadelphia workhorse parades, and isn't he a Percheron? He has the earmarks all over, although you see he is a draft horse but the product of a Percheron sire, probably the old fashioned sort, lighter, snappier, joined on probably to a good stout mare. Here is a representative of the fourth breed, a breed that by the way is showing a greater percentage of increase than any other breed in this State, and I think that is true the country over.

The breed of course has had a serious set-back on account of the war. We don't know just what we will do in the future for Belgian horses. We in this State I guess will depend on our Crawford and Mercer county breeders. Here is a breed that descends even more directly than the Shire from the old Flanders horse I have referred to. In the first place he is rather cold, he don't show the characteristic breeding about the head that the Percheron did, but he does not show the great development of hair that was characteristic of the old Flanders horses; he is a clean-legged horse as far as we can have him clean legged, yet he has bone enough to be in the draft class. What are the essentials of this breed? They are more environment than foundation stock. You have high hips from here back and from here up; that is, take the head and neck and legs and feet off a Belgian horse and I think we are safe in conceding that he will beat the world. There is no horse draftier in his body. You remember I said the Shire was the draftiest bar one; this is the one. There is no horse so compact, wide and deep as a Belgian unless it be a Shire; and wonderful ribs; but there are some things associated with that we have always to guard against. With this extremely short back we like so well in draft horses, we are always going to get a neck correspondingly short. If his neck is too short, it will have the same shape as a hog's neck, and where are you going to put a collar? A horse has got to have some shape to his neck to have a good collar. In the same way the extremely short body oftentimes gives us a very short leg that has a rather sturdy pastern with it. Don't understand me as complaining about the features of this breed.

I neglected to mention the heel of the Percheron. Those who did not like the feet of a Clyde horse, how do you like the hind legs of a Percheron horse? If the Percheron breeders don't do something to improve the hind leg of their breed, they are going to suffer the same as the Chester hog breeders did in Iowa. The breed was so popular that every white hog was called a Chester White, with the result that the breed itself fell into disrepute.

A Member: How do you like the forelegs of a Belgian horse?

DR. GAY: If he has got pastern enough, I like him all right.

A Member: What about his small knee? Can he pick himself up any?

DR. GAY: I say the best part of the Belgian horse is from here up and from there back and within those limits he is a pretty hard horse to beat. But when you consider the wonderful improvement wrought in the last 15 years, you have great hopes for the future.

Here is the proposition; what kind of mares are you going to breed to a Shire horse? What kind of mares are you going to breed to a Clyde? What kind to a Percheron? What kind to a Belgian? You will find that the Belgian horse will give you drafty bodies on colts out of the average run of mares we have in the east that carry a predominance of trotting blood, quicker perhaps than any other breed. You understand you cannot cross a cold blooded horse on a hot blooded horse; the more extreme your crosses, the more variation you get and as a result you come to a head-on collision; they simply stand at loggerheads; but on the other hand, if you can take a mare that is not too hot blooded and a Belgian horse that is not too cold blooded and make the mating there, I think you will find that you will get a better, draftier shape and form from a Belgian than a stallion of any other breed, on an average. The criticism of the Belgian is that he is cold, lacks quality, is not good in the face and legs. Our trotters will give him enough quality and enough refinement about the head and neck and enough bone in the legs and he will give them the body, the point at which they are most markedly deficient. Here is a pair of Belgians of Belgian breed.

A Member: Would you then cross a heavy Belgian or trotting mare with a Belgian sire?

DR. GAY: No, I say you cannot make two extremes a cross; you cannot take one of a straight hot breed and one cold breed and mate them, because you are liable to get a Belgian head and maybe a trotting horse body, and Belgian legs and trotter's feet. They have got to be somewhere nearly approaching; but what I mean is that where you have comparatively draft mares but averaging light waisted, leggy and want their form improved in draft lines, that is the class of mare that the Belgian horse will do the most good on. These are Belgian. They have the characteristic red color. They don't stand quite as nice on their legs as the Percherons or the Clydes that you saw in the other picture, but they have the form and shape. These are Percherons again, the same as I showed you in the first place.

In conclusion, let me just simply say this; when we talk about breeds, don't take the same stand on breeds that you take on politics—what we call voting on principle. Don't vote for a Percheron horse simply because he is a Percheron horse, but make him be a good one before you vote for him, and when it comes to a choice between a horse of definite breed or one by different lots of stallions, take the best horse regardless of breed and I think you are safer than you are to follow out this partisan breed sentiment that so many people express.

The CHAIRMAN: The next speaker is too well known to need any introduction. His subject is "The Pennsylvania Experiment Station, Its Work and Lessons," by Prof. R. L. Watts, Dean of the Experiment Station. It affords me much pleasure at this time to introduce Prof. Watts, who will address us.

Prof. Watts spoke as follows:

THE PENNSYLVANIA EXPERIMENT STATION, ITS WORK AND LESSONS

PROF. R. L. WATTS, *Dean Experiment Station, State College, Pa.*

Mr. Chairman, Ladies and Gentlemen; Friends and Farmers' Institute Workers: Some time ago I was told a story of a boy who had been given a very large toad as a pet and he kept his toad out in the yard where he could see it every day. A great many things about the toad interested the boy; but the thing that interested him most was the great variety of food the toad would eat. He took out little crumbs of bread; he would catch bugs and flies and even give the toad little pieces of tobacco sometimes. It seemed to eat everything with relish, and one day he found a very large, fuzzy, wooly worm and was wondering whether the toad would eat that worm. He took it out and the toad ate the worm and seemed to enjoy it. Later in the day he thought he would go back and see how the toad was, and he went and found the toad on its back with its feet sticking straight up into the air, tickled to death. Now that is about the way I feel when I come before an audience of friends, institute workers, I might say co-workers, because I have worked with many of you at the Farmers' Institute. I am afraid though that instead of being "tickled to death" to-night you are just about frozen to death and I am going to make my remarks very brief.

I have quite a number of pictures, but we will pass them through rapidly. The longer I live the more impressed I am with the fact that successful farming depends very largely upon the application of correct principles, that if you do not apply correct principles, your farming will not be successful. In other words, if you don't know that a thing is right when you do it, the chances are that your attempt will be a failure. I am going to illustrate that point by referring to a few personal experiences. One time I was down in Washington county, or Greene, I have forgotten which, attending a Farmers' Institute, and at the close of the afternoon session a farmer invited me to inspect his orchard. I went with him in his buggy to the orchard two or three miles distant, looked over the trees and made this remark; I said, "I believe that the thing that will help your orchard more than anything else is a liberal application of stable manure." I have never forgotten how the farmer was shocked by that statement. "What? Stable manure in an orchard?" "Oh," he said, "I don't agree with you at all." I said, "All right, you don't need to, but that's my judgment." Now I don't know that that was the thing that his orchard needed, but I thought it was the thing he should do to that orchard. Now if that same man or other men should ask me the question concerning an old orchard that was starved to death, I would say without doubt that that is a thing that should be done. Why should I say that with such conviction? Because our own experiment station, your experiment station at State College, has found, by experimentation on a large scale on different soil, types that there are many cases where a liberal ap-

plication of stable manure will do an orchard more good than any thing else, and my answer to that man was probably guessing, because we did not have data at that time which showed conclusively that that was a thing which should be done.

Let me give you another case; suppose a farmer or fruit grower fifteen years ago, when I attended a great many Farmers' Institutes in Pennsylvania—suppose that a farmer should ask me this question: What formula would you recommend for an orchard in bearing? What kind of an answer would I have given? Well I would have probably said this, "It is possible that you could use a fertilizer that would contain 4% of nitrogen, but it is unlikely, because nitrogen tends to develop growth, foliage, instead of fruit, and therefore I would be a little careful about that nitrogen; it is possible that only two or three per cent. will be enough; put on 8% of phosphoric acid, but potash is a thing all our fruit need, so put in 10% potash." Now what would I tell an orchardist in this State who has bearing trees? Would I give him that kind of an answer? Not at all; I should say, "We have found in our experiments, harvesting thousands and thousands of bushels of apples every year, that it is not potash that determines the fruiting qualities of an orchard, but it is nitrogen. We have found on twelve different soil types, that nitrogen has more to do with a big crop of fruit than potash." I suppose Dr. Stuart might say, "Use 6% of nitrogen, 8% of phosphoric acid;" and under certain conditions I think he would drop the percentage of potash to four instead of ten. What would cause him to give an answer of that kind? Why, the harvesting and the weighing and measuring of thousands of bushels of apples that have been harvested from orchards where he is making experiments.

Now when we must know the truth in farming if we want to win out as a business proposition, and that is why we have in this State today and in every other state of the Union, an experiment station to find out what is the truth with reference to the use of fertilizers and spraying material and foods and everything of this kind. We don't want to be guessing, farmers; we want to know what is right when we do things on the farm, and, therefore, Congress has been very wise in making rather liberal appropriations for experiment stations in different states of the Union. Now to-night it would be useless for me to attempt to give you very many lessons from the experiments at State College so that I have decided to show you rather a large number of pictures—in fact you will think this is a sort of "movies" to-night by the time I am through—that will show you the kind of work that we are doing at State College along experimental lines rather than the exact lessons that might be drawn from these numerous experiments. I want to say here at the outset that we are conducting three or four hundred different experimental projects and that we stand ready at all times to give farmers and friends and lecturers information concerning the results of these experiments which are conducted with fertilizers, livestock, horticultural crops, fruits and vegetables along almost every line.

Now if we have the light we will show some of these pictures. The college operates about 1,500 acres of land on which this experimental work is conducted, much of it, and where we provide feed for our stock. Before taking up the experiment station work, I thought you would be interested in seeing a few general views showing the col-

lege. This is the main building, the first put up on the campus. This is one of the oldest buildings on the campus, the armory, used more largely now as a gymnasium, showing attractive plannings around the building. This shows what it looks like on the campus sometimes during the winter. You will see here also the character of the trees on the campus. We have a great many fine specimens of various kinds of evergreens and similar trees. There is the Norway spruce, heavily loaded with snow. It seldom breaks with a heavy load of snow, which cannot be said of many of our trees. This shows the agricultural building, which was the second of the new buildings, the newer buildings on Agricultural Hill. Over here to the right is the old experiment station. Here we have a picture of the new horticultural building which was completed last year and is perhaps the best single horticultural building in the United States to-day, completed at a cost of \$120,000. That shows the entire student body assembled in front of the auditorium. The enrollment of the college is now about 3,300. Eight hundred of this number were summer school students. This shows the growth of the enrollment of students in the School of Agriculture. Back here in 1904-05 we had only 73 students; the next year we had 94, the next 111, the next 202, and so on, and this year we have 1,237.

I want you to note one thing about this chart showing the enrollment of agricultural students, and that is that this line is decidedly shorter than that. We enrolled fewer students last year proportionately than the year before. Do you want to know the reason for that? Simply because the college was forced to refuse admission to several hundred students because of lack of class room and laboratory facilities; everything was filled and we were unable to take care of more students. I hope that condition will not exist at State College very long, because one of the hardest things we have to do is to turn away farm boys who have saved money to take a course of study and send them home again because we haven't room for them. They seldom return to the college to take the course.

A. Member: How many farm boys are in the enrollment now?

PROF. WATTS: I cannot tell you exactly. The courses in agriculture seem to be attracting more students right now from towns and cities than from the farms. It has been said that the farmers' boys take engineering and the city boys take agriculture. I don't think that is likely, though I suppose we have in agriculture five or six hundred students to-day. That point is exceedingly interesting. Some have said that those city boys will not make good on the farm. If the city boy makes good in his college course, if he stays there long enough to complete a college course and acquires in addition to his technical training practical experience, the city boy will win.

If I had time I would tell you about a good many city boys who have become farmers, gone into various lines of agricultural pursuits and are making good. It is simply a matter of whether he has the practical experience or not. This shows a football game among the students on the college campus. Whether it is of value from a military standpoint, it is an excellent thing for the students to have this military training of two years; it gives them better car-

riage, teaches obedience and has a distinct value. This shows the exhibit made at the county fairs every fall; we have it in duplicate and show it at a number of the fairs every fall. That shows the farmers at Farmers Week. Last year or perhaps the year before we had something over a thousand people at Farmers' Week. It is always held between Christmas and New Year Day. Here we have a rear view of the Dairy Building. Most of you know that the college operates a commercial creamery placed in this building. Several hundred farmers send milk or cream to the dairy building; it is open to admit all kinds of dairy products, cheese, butter, ice cream and so forth, and much of this work is done by students, so it is a commercial proposition and gives our students actual practice in working up dairy products. You have heard probably of the new dairy barn which was completed last summer, and many people say this is the best looking and most popular building on the campus. It was completed at a cost of something more than \$30,000. There is one statement I hadn't thought of making at this time, but I think it is right you should have it; the legislature appropriated \$20,000 for this barn, and from the earnings of the college farm and of the creamery, we were able to put more than \$10,000 into this building, so that we have a structure there of over \$30,000. There are some features about this building that perhaps will interest you. We have two large silos, one at either end of the barn. One is built of hollow tile with stucco finish; the other of concrete with stucco finish. You will notice there is no barn floor such as they have in most barns. About half of the building is used for the storage of hay. Last summer we had 100 tons of hay stored at this end of the barn; over here we have our feed rooms, students' rooms and other rooms necessary in structural work.

The next few slides will show this barn. On the side here is a milk room and you can see the large number of windows all along the side of the room. Here you will see more details of the construction of this stucco over the end of the barn and along the side about four feet of the base of the barn is brick. This is the interior of the yard enclosed on three sides; a very cosy, sunny place for cattle, in the winter time. We think we have the best barn in the United States, considering the size and type of construction, and it was put up at a very low cost.

A Member: What is the size of it?

PROF. WATTS: I don't believe I can give you the dimensions of that barn. Is there anyone here from State College who remembers the dimensions? It is a large barn. Here we have the interior view. You will notice that the cattle face each other. The feed is taken down here on the cart and delivered along in front of the cattle. Then the manure is taken from the stable around the side. You will notice the carrier. One of the best lines of work that is being done in the dairy department is the judging of butter. Butter is sent in from all over the State, from creameries and farms and individuals, and it is scored and the results sent back to them. It is a line of work which has been very productive for good. I want to show you two animals.

All the pictures you will see of animals to-night represent cattle or stock on the college farm. We have here an Ayrshire cow which is a very good specimen. Here is a Guernsey of the college herd. We are attempting to build up four herds of the leading dairy breeds. We have here the Jerseys. I am sorry to say that we haven't anything to show to-night of the Holstein. Here are some of the Jersey cattle on pasture near the Experiment Station. A large part of the college farm is used for pasture purposes. Here are some Jersey calves. Here's the Ayrshire bull which heads the herd. Now in our cow testing association work, which is growing and is growing in importance, this is one of the cattle, one of the cows, which was found—a very poor animal, as you will see, and the next picture will show you a profitable animal. There is no question about the fact that there are hundreds and hundreds of cows in Pennsylvania farms that are simply boarders, not paying any profit at all.

I want to show you a few views of the horticultural department. Here is some intensive work in gardening and overhead lines of irrigation. There is something that I think every farmer and villager who has access to water at a pressure of 15 pounds or more should provide at least for the home garden. It certainly makes production much more certain in commercial gardens and adds to the profits of the business. This shows a lot of seedlings of cabbage, showing how much stronger some varieties are in germination than others. Mr. Myers, of the Department of Horticulture, has been making a study of strains of cabbage for a good many years. When I grew cabbage some years ago, I thought the only thing to do was to buy seed of a certain seedsman because I considered him reliable and thought he had the best seed. I want to acknowledge that to-night, because I used seed from a certain house. The probabilities are that I lost \$50. or \$100. an acre some years because that was not the best grade of cabbage. This is a row of cabbage from seed gotten from one of the best seedsmen, which is decidedly leafy. This is very much smaller, while that will not approach this variety or strain in ability to make money. This shows a view of the entire field, or part of it, in the cabbage work. Now the next picture shows the great difference in maturity; that row of cabbage remains while this row has been cut out. That row was cut out and sent to market and brought high prices, while by the time this row was ready, the prices were down. Some of these strains have been making a hundred dollars more to the acre than another of the same variety, and if you can buy or produce seeds that will make \$100. or even \$25. more to the acre than an inferior strain, it is certainly well worth taking into account. That shows a plant grown from seed bought from one of the most reliable seedsmen in the country, a leafy type with a very shall head. Note the difference; there we have a conical head; it is hard, goes to market at a high price and pleases the consumer. Both are Jersey Wakefields. These strains of cabbages, tomatoes and other vegetables vary tremendously in their earnings and their yielding power. It is all Jersey Wakefield cabbage, but a different line of each variety. The black line represents the first type.

Note here that this variety or that strain cut only two-tenths of a ton the first time they made the cutting, while down here this line cuts four and a half-tons at the first cutting. Suppose we are getting \$50. or \$60. for cabbage the first cutting—see what a tremen-

dous difference it makes. This strain yielded only 4.1 tons of Jersey Wakefield, which does not produce high to the acre, while there are other strains that ran $8\frac{1}{2}$ tons to the acre. You will note a great difference in the yielding power of different strains, showing the importance of good seed. The same thing is true of the tomato to a less extent. The black lines represent the tomatoes harvested up to August 13th, while the long lines represent the total yield. This strain yielded a little more than half as many tomatoes as this strain. Suppose you are growing tomatoes for the canner for which you are getting \$10. a ton; you have a strain that produces 12 or 15 tons of tomatoes to the acre, say 15, which is not an unusual thing. We have many strains at State College which are running 15 tons to the acre. That means \$150. to the acre. Suppose you have other strains that produce only 10, that would be \$100. to the acre—quite a difference. There are wonderful possibilities from using better seed on Pennsylvania farms, not only in market gardening but in general farming as you will see later from some pictures.

This is an interesting picture showing the influence of soil in the starting of young plants. This experiment was started just this spring. Most gardeners believe that the thing to do is to mix up a good rich soil for starting the plants. These plants were grown in rich, limestone soil in the greenhouse. I want you to note that these plants are strong, vigorous and healthy. I also want you to see that the root growth is not very strong; the top is all right, the foliage is all right, but the roots, with the exception of that plant, are not very satisfactory. Now note the next picture and see what that looks like. Here we have small plants with long, strong, vigorous roots; these plants were grown in pure sand. Before I started on this trip, I went out to the field where these plants are now growing and noticed that these plants, which are plants with small tops but large root systems, are probably a third larger at this time than these plants grown in a rich loam soil; so the lesson drawn from this experiment, although this is the first year it has been conducted is, that it is not desirable to start planting in soil too rich. The all important thing to accomplish is to produce a strong, vigorous root growth rather than excess of top growth. In our tomato experiment, we found a plant a few years ago which produced tomatoes like these, all cracked and rough, ill shaped tomatoes, and those plants that continued to produce that kind of fruit where no attention was given to selection. On the other hand we have found plants among various varieties which were unusual in their fruiting qualities and produced tomatoes like these.

Our truckers are learning that they can make tremendous advancement in their profits and yields by exercising greater care in the selection of seed. The next picture shows the same lesson. Here were two unusually good plants; over here we have harvested from that plant 89.9 pounds of marketable tomatoes; from the plant over there we have marketed 80 pounds of good tomatoes and harvested 6.2 pounds of tomatoes not fit to send to market. Those are unusual yields because they were grown on plants unusual in their profit yielding capacity. A variety of tomato known to everyone is the Masters, a new variety. It appeared 8 or 9 years ago. It is an unusually productive tomato and very satisfactory in most soils. Mr. Miles took the Hummer and crossed it on the Masters and here

is what he got. I wish you could see those plants in the field where you can look down on the tomato plants and see 40 or 50 ripe specimens one one plant, where it has not been picked, the first of September, and everyone of them perfectly round, smooth and sizable tomatoes. This shows a crate of tomatoes in the college greenhouse. We have found that the Globe and Bonny Buster were the most satisfactory varieties for growing under glass. Now going out to the fields again, one of the most important experiments we have made is with asparagus and the next picture will show the result of this work. I don't think you can read the figures back there, but I wanted to stop long enough to tell you just what this means. We have made the experiment with two varieties. We made the planting seven years ago and graded the roots into three different sizes, large, medium and small roots. The interesting thing about this experiment is that the small root and small plant that came from those small roots have never caught up with the medium size and that the medium sizes have never caught up to the large ones. Let's look at the returns first. This represents the largest root. We made the first harvest in 1910, and those roots produced at the rate of \$160. to the acre. Now, with the medium sized root, the No. 2, the yield or returns were considerably smaller, with one or two exceptions. The first year we got a little more from No. 2 roots, but from there on the No. 2 returns were smaller. Now, you will note down here that on these small roots the showing is still more marked, but you will note that those small roots have never caught up with the large ones. If you want to grow asparagus and want to plant 1,000 roots, grow the 3,000 yourself from selected seed, select 1,000 out of the 3,000 for planting, and your returns will be large.

Now, a little about our orchard experiments. We saw awhile ago that in certain orchards of Pennsylvania, manure can be applied to better advantage than anything else, and in other orchards, commercial fertilizers. In this experiment in Warren county neither money nor effort has made any appreciable showing. In this orchard, which is in Lawrence county, during six years, nitrogen and phosphoric acid has given increased yield, or has given a yield of 305 bushels to the acre. You will note here that those trees on this side have been fertilized with nitrogen and phosphoric acid and those other trees have not been fertilized. These trees are evenly loaded with fruit, while there is practically no fruit on this side. The results have been unusually striking in Lawrence county, showing the value of nitrogen and phosphoric acid. This experiment in Bedford county—the results have been equally striking or practically so. We have harvested 335 bushels in the seventh year, to the acre, showing the result of nitrogen and phosphoric acid. This is a Baldwin tree seven years of age. We topworked it on Northern Spy and at the seventh year picked a bushel and a half from the tree. Now, we wanted to draw out here a few lessons, which I think are of unusual importance to Pennsylvania fruit growers. Between those apple trees we are growing potatoes. In the experimental orchard at State College, on limestone soil we have found out that the apple trees, Baldwins, Stamens, Winesaps and some other varieties, that the apple trees have been growing where we are growing potatoes between the rows, have made 12% better growth than where we have

followed the most approved method of orchard management. I mean by that, plowing in the spring, harrowing until midsummer, and then starting a cover crop, plowing that down the following spring, and keeping that up year after year.

Now, that is not all of the story. These potatoes, or beans and peas, as we have used sometimes, have returned from \$50. to \$75. to the acre. Now, of course, we cannot utilize all the ground, and these figures are very conservative. Limestone soil is not a good potato soil, and having a good potato soil you should do much better, but our returns have been \$50. to \$75. to the acre. That means that the farmer growing crops between his trees will more than pay for the expense of that orchard while it is coming on and make a profit out of potatoes besides. I am sorry that I cannot show you a part of the orchard showing the trees mulched. The finest apple trees in this young orchard at State College are where we have mulched them every year heavily with straw. Those are the finest trees in the orchard. These trees are better than any other trees, even those where we have gone through the potatoes, where we have planted cover crops. I have to make one exception, where we have grown alfalfa, taken the alfalfa and mulched the trees, we have gotten better growth there than where we have mulched with straw, and that is due to the larger amount of nitrogen added to the trees. We have a cover crop of vetch, one of our best cover crops in Pennsylvania, certainly on limestone soil, where we have been making this experiment. Soy bean is also very good and certainly better on a limestone soil than cow peas.

There is another lesson I want to bring to you; we referred to alfalfa a moment ago as being desirable to grow in young orchards. The best trees in that orchard are where we have grown alfalfa, mulched the trees with alfalfa so heavily, that the moisture is conserved more perfectly than in uncultivated areas. There is one other lesson—it is possible to grow a surplus of alfalfa in that young orchard which can be sold or used as hay; in other words, the growing of alfalfa in the young orchard is worth considering as a business proposition, aside from the growing of strong, vigorous young trees. I think that these are the most important lessons that can be brought from our experimental work with fruit trees. There is a picture showing some experiments with ground rock on peaches. We found that some of the commercial preparations recommended for the spraying of peach trees are decidedly injurious and should be used with great care. The trees must always be protected from mice. We keep the straw away from the tree a little way, but if you will use wire collars to keep the mice away, it is certainly very successful.

A Member: They get under the protection and eat at the roots.

PROF. WATTS: We have not experienced that trouble at State College so far as the growth is concerned. That certainly is a very satisfactory plan. This general conclusion might be drawn, that that plan of orchard management is best, so far as the tree growth is concerned, which conserves the moisture most perfectly. It is a moisture question very largely. Now for a few pictures. We have here our new stock judging pavilion, which is heated comfort-

ably and used all the year through in the stock judging work. It shows an interior view of the pavilion, with chairs all around and seating capacity for 800 people. We have here a group of cattle used in the feeding experiment. We have found that the most economical ration is silage, and $2\frac{1}{2}$ pounds of cotton seed meal per 1,000 pounds of livestock. That is better than where the cattle are given corn fodder and hay for the range. Silage must enter into the ration if you want to feed beef cattle economically and get the best results. Of course, we use different combinations, but we have one lot every year which receives no other roughage but corn silage and $2\frac{1}{2}$ pounds of cotton seed meal per 1,000 pounds of live weight. Our herd of pure bred breeding cattle is treated in the same way and we are not able, at this time, to see any injurious effects from that kind of roughage, only I think most farmers would prefer mixing in a little clover or alfalfa or some other dry roughage, but the results have been very satisfactory at State College.

This shows a low constructed shed for sheep, very inexpensive, yet one which works out very nicely, built on the south side of one of our barns. This shows one of our Berkshires on a blue grass pasture. We are also making some experiments on the Spring Creek Farm, and here the hogs are having a real good time pasturing on oats and Canada field peas. Now, this looks like a sort of a hoggyish trick, to turn the hogs into the corn, but they make a good job in harvesting it, they don't waste very much, and another curious thing is that these hogs made gains a little faster than the hogs where they were fed corn carried to them every day. That plan, of course, is more popular in the West, I presume, than it ever will be in Pennsylvania. This shows some of our sheep pens used for hogs down on the lower farm; they are a sort of portable pen. Here is a herd of some of our steers on Spring Creek Farm; pure bred steers. I want you to note there the character of land, the rough, rolling land. A great deal of this land should not be farmed, though it is not as steep as much of the land which is in tillage in Pennsylvania. We are doing everything we can to encourage the livestock industry. We believe that too much land in Pennsylvania is farmed too intensively, that there are thousands of acres on the steep hillsides that should be put into grass and grazed rather than plowed and farmed in an intensive way.

A Member: Do you ever fertilize that hill land?

PROF. WATTS: We are making some experiments and it responds quickly to the application of commercial fertilizers or manure. We have a field, which, when we bought it three years ago, was very weedy. The weeds have disappeared and it is getting better all the time, but probably it would pay better to fertilize that land with fertilizers or manure and then put cattle in it. I want you to note these cattle which have come down into this stream on a hot summer day; it is a pure stream that comes from the mountains and it is one of the best things we have at State College, this pure stream of water for our livestock. That shows a lot of steers which were being prepared for the International Show. We have one of the younger animals, a very good animal here. This shows our herd of pure Angus. Here you get a better idea of

the character of the land. This over here is very steep. That is taken down on the lower part of the farm about three miles away from the college building. They make a beautiful appearance, these black cattle on the pasture. Every one of these cows that you see here had been wintered for several years on corn silage only as their roughage and came out of the barn in the spring fat and round as rolls of butter. Here we have a bull that heads the short horn herd. I want to show you now a couple of pictures of a couple of Herford steers, very nice animals. This is another specimen. We buy a carload of horses almost every winter and conduct a fattening experiment, a feeding experiment on different methods of feeding horses and preparing them for market. This shows some of these animals; they are all western animals and we get some very good ones among them.

A Member: Are the farmers that visit the college grounds allowed to feed cattle?

PROF. WATTS: They are permitted to see the cattle out on the pasture, but we are not allowing them to enter the dairy barn. I don't know just when we will take the quarantine off, but we have so many cattle there and we have kept the record for so many years that we feel we would be taking chances to take the quarantine off the dairy barn. They just had a new outbreak of foot-and-mouth disease in Philadelphia recently and we think we are justified in keeping the quarantine on the new dairy barn.

A Member: In which way can you make the most economical gains on your feeding of stock in winter, in open sheds or barns?

PROF. WATTS: According to our experiments at State College, the use of corn silage only as roughage and then of course as the time approaches to put them on the market, the use of cotton seed meal, if we don't use cotton seed meal, they will have more or less bowel trouble, and this seems to be necessary to maintain the good health of the animals.

A Member: My question was, can you make the greatest gain in open sheds fresh air or when they are confined in a barn.

PROF. WATTS: I did not catch your question. All of these animals are kept in open sheds, we do not believe in confining any of the big beef cattle to closed houses and I doubt whether it is best to keep the dairy cattle in. Our new barn is so well ventilated with windows that it is practically outdoors. I believe experiments have been made which show that even the dairy cattle will do as well in open sheds as in the closed stable, but that is a little out of my line.

I want to show you just two pictures showing the type of work done by the Department of Botany. Here we have the brown rot on the peach and the next tree shows the mumified fruit under the tree. That will be controlled by proper spraying. Now we want to show you a few pictures of the Agronomy Department, then we will be through. You have all heard of the fertilizer plots of

State College having the longest continued fertility experiments of any state in the Union. On the left where you see these three piles of hay, three piles on each plot, over here this plot has received burnt lime at the rate of 4,000 lbs. to the acre every fourth year. That plot has also received 6 tons of manure every year in rotation, a four year rotation. This central plot has received lime only at the rate of 4,000 lbs. to the acre every fourth year, while this plot has received nothing.

These experiments have been in progress for 33 years. We haven't time to stop to draw all the lessons that might be drawn from these experiments. One lesson is that lime in large quantities alone will do no good whatever as a long term proposition. There are former attempts to use lime which show that it does not maintain the supply of organic fertility in the soil. There will be no benefit whatever from it, because the crops on this farm where nothing has been applied for 33 years are practically just as good as on this where lime has been used. We also learn that the use of any fertilizer which keeps the soil in a highly acid condition is undesirable, that the judicious use of fertilizer on this land will maintain fertility and result in crops just as satisfactory as where manure has been used. Now that is a strong statement to make, and yet we can back it up. A few years ago farmers came down and looked over the fertilizer plots and they would go down the alley and look at this plot and say "There is a fine plot; how has it been treated?" "Why, we used manure and lime on that land for 30 or 33 years." Then they would go down and say "Here is a plot that looks just as good, how have you fertilized this?" "We have used commercial fertilizer on this plot." "No manure, no lime?" "No, no lime; nitrate of soda has gone into that plot and helped to keep the soil sweet." Then the farmers would say, "That's all right on a little plot of land but it won't work on a big farm." They used to say that to Dean Hunt, so finally Dean Hunt said, "All right, let's try it out on a big farm;" so he went across the road and rented a farm. We have been farming that land five or six years and I want to say that we are handling that land successfully without manure; there is no manure used on that farm and hasn't been for five or six years. We harvested there year before last over 30 bushels of wheat to the acre, threshed out 37 bushels last year and the fertility is being maintained by the use of commercial fertilizers and lime.

Sometimes we are taken to task for calling attention to this experiment on the Mitchell farm. Last year a banker, very much interested in the development of agriculture in this State said, that we were making a big mistake. I told him we had no right to keep that fact from the farmers of Pennsylvania. While we want to encourage the livestock industry because it is one of our most important things in Pennsylvania, yet every farmer should understand that by the judicious use of lime and fertilizers he can increase the productiveness of his farm and increase his earnings. It does not necessarily mean that Pennsylvania is to abandon the keeping of livestock, but it does mean that every man should study the use of fertilizers and lime and that the productive power of a limestone soil can be maintained by the use of fertilizers and lime.

A Member: Could you produce that wheat at a profit?

PROF. WATTS: Yes, the wheat was produced at a profit. The experiments have not been conducted long enough to answer that question as definitely as I would like to at this time, yet we do hold figures on the comparative cost of production on these fertilizer plots and the manure plots.

A Member: Was any humus injected into that soil?

PROF. WATTS: Only as it came into rotation from the clover that might be left on the ground and from the corn, wheat and oats.

A Member: What is the rotation?

PROF. WATTS: On the farm plots, corn, wheat, clover and oats; on the farm it is wheat, clover and corn.

A Member: In cutting the wheat, did you take any pains to leave lots of the straw while they cut?

PROF. WATTS: No, not at all; cut it in the usual way.

A Member: What kind of lime did you use?

PROF. WATTS: Well, we used different forms of lime; ordinarily just common burnt lime.

There is another man to follow me, so I will have to hurry. I simply want to show you a few samples of corn, unusually fine ears, champion at one of the corn shows; that shows a selection of a number of very good ears; that is a dent variety, I don't know the name. Here is an exceedingly interesting experiment showing 30 some hills of potatoes, all selected from one plant; you can see what a tremendous difference there is in the result from these plants. I want to say that we have made decided progress in hill selection. Now we have a timothy garden which is exceedingly interesting, showing the variations in the timothy; and this breeding work I believe will result in great value to the State. It is being carried on at Cornell University, and this next picture will show what is happening at State College. The best plot here of this pure bred timothy has yielded at the rate of almost half a ton more to the acre than the ordinary timothy which we find on the market. We hope to have this seed before long to send out in small quantities to farmers to try out. We are also making a variety of experiments with wheat, corn, potatoes and oats.

Now, then, I don't believe that this slide has ever been shown away from State college. We have not said very much about our selected work, but I do want you to know that Mr. Nolden's Department of Agronomy is doing a great work along the line of selection. We are working with three different varieties. Now it is an experiment to determine the value of selection, picking out special plants and breeding them until you have enough that is worth while, and we have some that are worth while. Take Re-

liable, for example; it yielded 32.1 bushels to the acre, while selections which have been developed at the college have run 37 and 38 bushels to the acre. Notice Golden Sheaf; the normal yield of the variety as we started it was 37 bushels to the acre; our selections run 44 and 45; and down here with the Pulcaster the difference is even greater; the normal variety ran 30 bushels to the acre and our selections ran 35 and 40. We think that work is going to be valuable to the wheat growers of Pennsylvania and will soon be in shape to put the results before the people in a form that will be worth while. Now you will note that each of these ears of corn are numbered. Will someone from the audience tell me which is the best ear? Can you see the numbers.

(Some of the audience selected No. 82 and others No. 80.)

PROF. WATTS: Now the point I want to bring out is that these ears of corn represent an ear to the row test; the figures below are not the numbers but represent the yields which have been produced by these different ears on the average basis. How about this ear? Does that look good? You don't like the looks of that, do you? That ear produced 81 bushels to the acre yet you would not think of selecting that for the corn show. Whoever picked No. 82 made a good selection, because it produced 82 bushels of corn to the acre, yet it is not a very good ear for the corn show. Over here is an ear that does not look so bad, in fact it is a much better looking ear than some of the others, and yet that produced only 55 bushels of corn to the acre. The lesson is this, that you cannot tell from the looks of an ear of corn what it is going to do when it is planted; the only way to find out is to make an ear to the row test. Corn is just like people, you cannot always tell by the looks of a person what there is in them, and so it is with corn.

(On account of the cold weather and inability to heat the hall, the meeting then adjourned until Thursday, May 27th, 1915, at 9 A. M.)

Thursday Morning, May 27, 1915, 9 A. M.

Mr. J. T. Campbell in the Chair.

The CHAIRMAN: Now, my friends, the time is here for opening the session this morning and I hope you will all make yourselves as comfortable as possible and we will try and have a good session. I believe Mr. Martin has a word of announcement the first thing.

DIRECTOR MARTIN: Friends, I am in receipt of a letter from the County Chairman of Jefferson county sending his regrets at his inability to attend on account of the serious sickness of Mrs. Cowan. Mr. Cowan sends his kind regards to all the friends. I also have a telephone message from Mr. De Witt who took sick on the way here. He is in the hospital at Meadville. His condition

is not considered serious, and yet he is quite a sufferer there. He also sends his regards to the workers. This condition of weather, as you know friends, is one over which we have no control. If we thought we had, we would tackle it, but we don't have, and we are made of that kind of fibre that we make the best of all situations and all circumstances. The hotel people have kindly offered us this room in which we can at least be comparatively comfortable, as compared with the auditorium, and we deem it best at this time that we take up for consideration, first, the remainder of the program for yesterday evening, Prof. Cooke's illustrated address, and then after that we will drop the Institute session until this afternoon, awaiting the appearance of Mrs. Morgan and the other lady who is on the program. If they appear by noon, we will then take up that part of the program this afternoon, so that if circumstances will cut us off with the additional session, we will be compelled to omit the institute sessions you see here; so the first will be the illustrated lecture, as Mr. Campbell has said, by Dr. Cooke on "The Relation of Birds to Agriculture."

THE RELATION OF BIRDS TO AGRICULTURE

By DR. WELLS W. COOKE, *U. S. Department of Agriculture, Washington, D. C.*

Mr. Chairman, Ladies and Gentlemen: The question of the relation of birds to agriculture is something which has taken up a good deal of attention in the last few years and has at last, after many years of agitation, finally been taken up by the United States Government; and it was in connection with my work under the Federal Migratory Game Bird Bill, the bill for protecting migratory game birds and migratory insectivorous birds, that the material was obtained which I want to talk to you about this morning.

Now we will start right out with the slides. I wish I could say that all birds were beneficial. If I could, why that of course would end the discussion. But unfortunately, some birds are not beneficial, although very fortunately the number is a very small part of the total number of birds. We have here in Pennsylvania about 375 different kinds of birds, and out of those we can say that only three are entirely injurious. One of them we have on the screen now, the great horned owl. Its food is quite largely the beneficial bird. It is given here with a quail in its claws, although I think that the painter, when he put that there, rather stretched the facts of the case. I don't think that the great horned owl ever does much injury to quail, but the next one we have on here, Cooper's hawk, is shown with a quail in its claws because that is probably the worst enemy, next to man, that the Bob White has. The Cooper's hawk comes down in the field, and if he finds a covey of quail he is pretty apt to stay right there until he has taken the last one of them. The sharp-shinned hawk, which is very much like the Cooper's hawk, only a little smaller, is the third one of the three kinds of birds we have in the State which may be considered as entirely injurious. But I don't want you to consider that because these birds that I have mentioned as injurious are hawks and owls, that, therefore, all hawks and all owls are in-

jurious; on the contrary, the hawks and owls are among the good friends of the farmer and we have had one experience at Washington which showed this very plainly. A pair of barn owls lived in the tower of the Smithsonian Institution and a man there in Washington in our office took it on himself to find out what those owls were eating. An owl does not tear up its food very much, it swallows it almost whole, and then the bones and hair, the indigestible parts, are thrown out as pellets from the mouth and these pellets accumulate in large numbers where ever the hawks roost or nest, and this gentleman went up in the tower of the Smithsonian Institution and gathered up these pellets to see what these owls had been eating and he found that those pellets were composed almost entirely of the bones and hair of mice. He counted the heads of over 700 mice in the pellets from that single pair of owls in that one winter, so you can see how largely they have been working for man's benefit. The two hawks on the screen there now, the red tailed and the red shouldered, are those that are commonly called the hen hawks, and yet they do not deserve that name. It is very seldom indeed that either of those, which are our largest hawks, take anything in the poultry line. Their food is the smaller mammals, mice. The sparrow hawk, our smallest hawk, receives that name, sparrow hawk, simply because it is small. It really does not eat sparrows, its food is very largely grasshoppers during the summertime and mice in the winter.

Then we come to the group of sparrows which are pre-eminently the seed eaters, and yet we have one exception. Sparrows are beneficial with just the one exception of the English sparrow, and unfortunately it happens that it is the most numerous of all. I had expected when we made a bird census last year, a census of the birds of the United States, that we would find the English sparrow to be the most abundant bird in the United States, and I was quite surprised when the returns came in to find that the robin exceeded it. Judging by the census of last year, the robin is the most numerous bird in the United States. To us who live there in Washington that seems a little queer, because robins with us are rather uncommon through the summertime; they are almost a rare bird in the breeding season, and coming up here yesterday, I noticed particularly as I got north of Pittsburgh and up into this northern part of the State how numerous were the robins. The train scarcely passed a farmhouse anywhere without my seeing from two to four or five pairs of robins. It seems queer that the English sparrow should have been brought to this country, because it was brought to rid the trees in Central Park, New York City, of the worms that were destroying them. Well, the sparrows never did eat those worms, they never would, they are insect eaters but they found here a climate that was congenial, they found plenty of food and they have multiplied until now they extend from ocean to ocean and have become, as I said, almost our most common bird. And yet I was glad to see, a few years ago that even the English sparrow could do some good. We had there in Washington an attack of the seventeen year locusts and they were very abundant, just a hum all day long, and from the time those locusts came out of the ground the English sparrow practically gave up all other food and devoted itself to the seventeen year locust. It

would fly up in the trees, grab a locust, bring it down to the ground and it seemed to recognize that if it ate the whole locust it would get filled up too soon, so it would just grab it by the head, pound it up and down on the pavement, pull off the head, eat that, leave the body and get another locust. It must have killed thousands and tens of thousands of locusts, so there is one good deed you will have to credit to the English sparrow.

The crow I suppose has been the cause of more profanity than any other bird in the State of Pennsylvania, and yet I doubt if even the crow is quite so black as he is painted. He does like to pull up your corn and has been accused, and I guess rightfully, of stealing eggs out of birds' nests and taking even the young birds, but there are two sides even to the crow question. You take it along in the spring when the young crows are just growing and they have got tremendous appetites and keep those old birds hustling all day long to fill the mouths of those young crows, which are fed quite largely on the white grub of the larva of the May beetle, which is one of the bad insects or bugs on the corn or strawberries, in the grass patch and then later on in the season when the young are full grown, both the old and the young feed quite largely on the grasshoppers; so you see there are two sides even to the crow question.

I suppose the robin has been the cause of more discussion than any other one bird. I remember once we were having a meeting down at Lancaster and I had been talking in favor of the birds and a man got up and said, "I want to register a protest against the robin; it does us a great deal of damage in our fruit." When he sat down, another man got up and said that that was just his experience exactly. It is only a little while ago that the people in New Jersey, the fruit growers in New Jersey undertook to get the New Jersey laws changed so as to allow the killing of robins; but the friends of the robins proved more numerous than the fruit men and succeeded in keeping the law on the statute books that prohibits their killing. I think the worst hard luck story I have ever heard in regard to the robins comes from California. A gentleman went out into one of those valleys up in the foothills of the mountains and set out a fruit orchard and the land proved favorable, all the conditions were favorable, the trees made a good growth and when they came into bearing, he expected to receive a good return on his investment. It happened that the first year that the trees were in full bearing there was almost an entire failure of the native fruit upon the mountains above him, and the robins that ordinarily would live on that native fruit and that much prefer the native fruit, if they have their choice, came down on to his orchard and cleaned out everything as fast as it ripened. Naturally he was very wrathful and he went down on the lowlands and went around among the orchardists there and tried to get them to unite with him in a petition to the Legislature to have the law changed so that they could kill the robins, and he could not find a single person who would unite with him in that campaign. They said, "We know they have taken some of our fruit, but we have become convinced that on the whole they do us more good than they do harm." The food of the robin has probably been studied more carefully than that of any other bird, and it has been found

that while it does take some fruit, yet, when the young are in the nest, those young are fed almost entirely on insect food, and the amount of food that a young robin takes is almost beyond belief. It eats more than its own weight of food every day. Now just think what would happen in this hotel here, what this proprietor would think, if you folks should undertake to do that. And as I said, that food is almost entirely insect food and that comes at the time of the year when our crops are growing fastest, when insects are most numerous, when the insects are doing the most damage to the crops, so that the birds help us most just when we most need their help.

There is another bird, the woodthrush, on the screen here now, whose food and habits are practically the same as those of the robin, and I just wanted to show the results of that large amount of insect food that the birds take. The bird from the egg to this stage is about four or five days and in about the same amount more, that is in about ten or eleven days from the time the egg is hatched, the birds have become old enough to get out from the nest, so you can see the very rapid growth that comes from that very large amount of insect food that they take.

The bluejay is another one of our birds about which there has been some discussion. Personally I have known bluejays all my life. Where I was raised in southern Wisconsin, we had them in our yard; they nested there; we had them there all the year through and I never saw the least signs of any trouble of the bluejay with the other birds. There were plenty of other species nesting right around there. They were all on good terms, and yet reports come into our office every little while of bluejays doing damage.

The bobolink is a bird which used to be counted as one of the injurious birds. It has been a little queer in conditions of affairs there. Years ago when South Carolina was the principal rice growing state in the United States, there is no doubt that the bobolink did a good deal of damage. The bobolink winters down in South America, way down in Brazil, and sometimes in its northward migration it gets up into Florida and South Carolina about the time the rice is coming up in the spring; but it does not do much damage then, but passes on up and comes for nesting to this part of Pennsylvania and northward.

I was out a few minutes yesterday afternoon around the fields here, and I found a good many bobolinks were present here now—it is called bobolink up here; with us, in Washington, it is called the reed bird, from its habit of staying in the reeds at night; and down in the Southern states it is called the rice-birds. It nests from northern Pennsylvania and southern New York northward, principally in New England and the northern states up into southern Canada, and throughout all that region it is one of the best loved of the birds. It is one of the finest singers we have and throughout all that region it is very carefully protected both by law and by custom and a man would no more think of killing the bobolinks on his place than he would the dog or the cat, and so it has a care-free existence. Through the summer it raises a good family, and when the young are full grown, those small family parties unite into larger parties, and those into still larger as they move toward the south, and by the time they get into the Southern states

they have assembled into very large flocks. And as I say, years ago when South Carolina was devoted to rice growing, the bobolinks were very injurious on those rice fields; they used to get down there in the fall migration when the rice was in the milk. Rice grows on the top of a stalk like oats and the bobolinks, settling down on those rice fields to eat the rice, would settle on the stalks and their sharp claws would pierce the grain and let out the milk and they actually did more destruction with the claws than they did with the bill, and at first, in the early days, the rice growers used to try to kill them but they found they were too numerous for that and they have devoted their energies just to making a noise to keep the bobolinks in the air; they station the little darkey boys in the fields with guns to fire them off and make a noise and keep those bobolinks in the air and you can get some idea of their numbers from the fact that one planter in one year used up five tons of gunpowder, 10,000 lbs. of powder, just for keeping those bobolinks in the air off his rice field, and it was estimated that when they were at their worst they did a damage of \$2,000,000 a year.

Well now that has practically all ceased. South Carolina has ceased to be a rice growing state, and though the bobolinks go back and forth over that state as they did before, the investigation made by our office a couple of years ago failed to show any particular damage that was done by that bird. The amount of good that a bird can do depends, of course, principally on its habits; but also on the time of the year that the bird is with you and the two kinds of woodpeckers given here, the smaller one below, the downy, and the larger one above, are our best conservators of tree growth. They are with you all the year and their food consists almost entirely of the insects that would be injurious to the trees.

And here is another little bird, a great favorite of mine, the little chickadee, that is also one of the beneficial birds. It is small, it spends its time around in the trees, and through the winter time particularly, lives very largely on the eggs of the insects that it finds secreted in the cracks and crevices of the bark.

The cuckoo is not a very handsome bird, but he has the habit of that toad that was spoken of by the speaker last night, of taking little hairy things. Its particular food that it likes especially, is the hairy caterpillar. It is almost the only one of the birds that will eat those caterpillars, and I have been interested there in Washington to see how the habits of the bird has changed owing to an incursion of these caterpillars. The cuckoo is naturally a very retired bird, found out in the thick woods, but of late years the maple trees in the city of Washington have been attacked by the Tussock moth and the cuckoo has come out of the woods and come into town to eat those caterpillars of the Tussock moth, and we find them more commonly around the streets of Washington than I have ever seen them anywhere out in the woods.

I said in the beginning that persons had become convinced that birds were not receiving the protection that they deserve, that protection under the State laws was not sufficient and that it was necessary to get Federal law on the subject. The agitation for this began several years ago and as soon as the campaign was fairly under way the people in charge of it were quite surprised to find that a large part of the gunners of the United States came over

to their side. They had taken it for granted that they would have to fight against the hunting part of the community, but the hunters had awakened to the fact that the game birds were becoming lessened in number; the wood duck was one of the ducks, one of the game birds, that showed most conclusively that the laws were not strict enough, and so by the help of the gunners they were able to get through this Federal law.

The woodcock was another of the game birds which showed a very alarming diminution in number. This picture of the woodcock on its nest was taken at Washington. A man of my acquaintance found the nest, and by approaching very carefully, without alarming the bird, was able to walk up to the nest and stoop down and stroke the back of the sitting bird, while another friend took the photograph. So you can see what a very persistent sitter the woodcock is when the eggs are very near hatching.

When this Federal Game Law passed, it was almost the last official act done by President Taft, the signing of that Migratory Game Bird Law, just a few hours before he went out of office. That law covered migratory birds. It was found that Congress could not pass any other kind of a law. A bird which lived all the time within the boundaries of a state had been declared by the highest Court over and over again to be the property of that state and not subject to Congressional action, so that the only kind of a law which Congress could pass was one that would have effect on the migratory birds, those which passed from state to state, both in the game birds and the insectivorous birds. It happened that the carrying out of the provisions of that law was put in the hands of the Department of Agriculture, and I was one of the committee and still am, that has charge of the carrying out of the provisions of that law, and one of the first things we had to do after that law was passed was to find out what birds would come under the provisions of that law, what birds were migratory and what birds were not, and that has occupied quite a little of my time for the last two years.

The bird on the screen here now, the cardinal, is one of the best examples of an absolutely non-migratory bird. You do not have it as far up in the State as this, but it does come up just about to Beaver. It is quite abundant in southeastern Pennsylvania. As I say, it is an example of the bird which is absolutely non-migratory. Most cardinals are hatched and live and die and never go ten miles from the place where they were originally hatched.

The screech owl is another example of an absolutely non-migratory bird, staying the entire year right within sight of the home spot.

The goldfinch is another example of a non-migratory bird, with this difference—most people know the bird through the summer in that upper plumage there when it is black and yellow, but in the wintertime, the bird changes to another plumage represented by the lower bird, and a good many people that are familiar with the summer bird do not know it in that winter plumage; but the bird is here all the year.

Then we come to a series of birds—I have three or four of them—which are just on the dividing line. The meadow lark with you up here would be a strictly migratory bird; with us in Washington and

up as far along the coast as New York City, it is on the dividing line between migratory and resident. We have meadow larks with us at Washington all the year, though it is not probable that any one meadow lark stays there all the time. Our summer meadow lark goes south for the winter and their places are taken by meadow larks that come in from the north. But you see the legal point is this, that if we should undertake to arrest a person for shooting a meadow lark there under the National law, he could claim that that particular meadow lark that he shot was one that had stayed there all the year and consequently did not come under the Federal law, and we could not disprove it; the burden of proof would be on us to prove that that particular bird was migratory and we could not do it. The same applies to the red winged blackbird, although 95% of the red winged blackbirds are migratory, yet last winter, for instance, we had a few that stayed right through the entire winter, so that although up here they would certainly come under the migratory law, it would be a disputed point with us. And the same applies to the flicker, those birds which are most of them migratory, but a few individuals stay through the season.

Among the earliest migratory birds to come to Washington is this brown thrasher, and I take that particularly because that is a photograph from one of the most celebrated of Audubon's plates, the brown thrasher being attacked by a blacksnake and the other birds coming to the rescue.

Among the migratory birds that come down from the north and stay with us through the winter, is the golden crowned kinglet, so named from its crown. Among the real migratory birds is the red-start. That is as good an example as you can get of the common bird showing the three plumages, the full adult male at the top, the adult female in the middle and the lower bird is the one year old male which has the white throat of the female but shows a few feathers of the black coat which it is going to have next year. The Baltimore oriole is an example of a strictly migratory bird, going outside the United States for the winter and returning for the summer, and the same is true of the indigo bird, which is also shown with two plumages. The male and female scarlet tanager is one of the best examples and I wanted to show that particularly on account of the changes in plumage.

Probably all of you are familiar with the bird, the upper one there, showing the fully adult scarlet tanager in the full plumage; the one at the bottom is the female; the one in the middle is the male in the transition period. The scarlet tanager nests in this part of the country and all through the eastern part of the United States, and then in the fall, as soon as the young are fully grown and out of the way, the male begins to change its plumage from the scarlet and black to a plumage like the female; that is the greenish yellow, except that it keeps the black wings. It goes down to South America for the winter and winters there in that greenish yellow plumage; then as it comes north in the spring, it begins to shed those greenish yellow feathers and gets the red and as it comes into the Gulf states of the United States in the spring, it is like this middle colored bird, just changing from the greenish yellow

to the red. By the time it gets here, the greenish feathers have all dropped out and you have the scarlet and black bird you are familiar with.

The chimney swift is another migratory bird and apparently interesting from the fact that it is the only North American bird whose winter home we do not know. We have in North America about 800 different kinds of birds, and we know where everyone winters except the chimney swift, and it is one of our most abundant birds. We can trace it in late September and early October as it goes south and gets down to the Gulf states about the middle of October, and then it disappears. It could not disappear any more thoroughly if it was true, as used to be thought, that the chimney swift went down into the water and hibernated in the mud at the bottom of the ocean and the Mediterranean Sea; that was the old idea, and they could not disappear any more thoroughly if that was the fact and then five months later, along in April, they come back in their full numbers; but we do not yet know where the chimney swift spends the winter. I had a most interesting experience with these chimney swifts a few weeks ago. I was up at Harper's Ferry and over on the bank of the Shenandoah, opposite the town, I was there about six in the evening and happened to look over towards Harper's Ferry and I saw a large number of swifts circling around the town. I knew that meant that they were intending to spend the night in some chimney in the city, so we watched them there for a while and then concluded that we would go over nearer to them. As we started across the bridge, those circling clouds began to drop down into the chimney of one of the churches there which was right in plain sight and a great number of the birds went into that chimney while we were crossing the river. Then we went over till we were near the base of the chimney and I said, "We will stand here now and count as well as we can the rest of them that go in." The numbers had been increasing all the time by recruits and we got where we had a perfect view of the birds as they would drop down into the chimney and although I could not count them exactly, yet I tried to have my count lower than the truth rather than above, and we stood there for about an hour and a quarter, while those swifts were going into that chimney, and my count was 4,700 that went in. We estimated that a thousand had gone in while we were crossing the bridge; and, as I say, I thought my count was under the truth rather than over, so that the probability is that there was something like 6,000 swifts that roosted in that one chimney and it seemed to be a pretty small chimney.

Now that is a pretty big story. I was talking on birds there in Washington early this spring, and up to that time the largest number—I had seen the swifts go into chimneys a good many times, but the largest number I had counted was about three thousand, and I told them this same story about the swifts circling around and going into that chimney, only I put the number at 3,000, and I have heard from that from all directions since that time. It comes to me something like this: A person says, "Why, I liked your lecture, but when it was so good, why did you put in that nature fake about the 3,000 swifts going into the chimney?" Well you see I have just doubled it, I have got it 6,000 now.

The birds in migrating from eastern North America to their South American home—and there are something over 100 different kinds that make this migration—do not take what would seem to be the natural course. Suppose birds from eastern North America are going to winter down here in South America, you'd think they would come right across through here, across the West Indies and Cuba. That route is taken by a few birds. The bobolink goes across there and it is the most common bird that does. Then there is another course down through the islands that a bird could take and not be out of sight of land the whole day. We don't know of any bird that takes that course. The great bulk of the birds cross the Gulf of Mexico, right at its widest point, coming along through the eastern United States, going down the same general course, the trend of the coast, through western Florida and then across the Gulf and down to Central and South America, and that requires a flight of 700 miles across the Gulf of Mexico, and it is made in a single flight and in the night time. The birds start soon after dark, fly through the night and reach the other side just before daylight, and they are not tired by that trip, if they were they would not take it because they don't have to, they could go around, and we have proof that they are not exhausted by it because, in the spring, when the birds return, there are a great many hundreds and thousands of them that fly across from the southern shore, do not alight when they reach the coast of the United States, but fly all the way from 100 to 200 miles inland before they alight. There is one line out here, this route marked No. 1, which is a straight shoot from Nova Scotia straight south to South America, which of course would be the shortest route. There is no land bird that takes that route. Take a common little summer warbler, one of our commonest birds; it nests here, abundantly and winters down here, but instead of going across, it goes around nearly 2,000 miles out of its way; but there are some of the water birds that do take this route.

This bird and the golden plover is one of the best known birds that takes that migration route. This shows the two plumages, the black breasted, the breeding birds' summer plumage, and the white breasted, the winter plumage, and that bird does take that route across the ocean. It nests way up here in the Arctic, along the coast of the Arctic lands, then as soon as the young are full grown, both the old and the young come out here to the coast of Labrador. There is a berry there called the curlew berry which grows in great profusion over the Labrador rocks. That bird is very fond of them and the birds stay there several weeks, gorge themselves full and get ready for their great flight. Then they come down across the Gulf of St. Lawrence, out here to Nova Scotia, and then start on this straight flight across to the coast of South America. It is about 2,400 or 2,500 miles that they fly, and they make that entire trip without a stop, providing it is good weather.

I told you that the birds flying across the Gulf of Mexico made the flight in a single night. But it would be impossible for the golden plover to make that 2,500 miles in a single night, because birds, when they are migrating, are not flying at their fastest, probably about 40 or 50 miles an hour is as fast as they ever fly

in migration, and at 50 miles an hour it would require two whole days and nights of flying to accomplish that. Just think what that means,—flying continuously for two days and two nights without a particle of rest. The plover is not a bird which could light down on the surface of the ocean and then start again; it has got to keep going continuously for that 48 hours. And yet we have reason for thinking that the bird even in that long trip is not exhausted because, if it was, it would not take it, it does not have to, it could just as well go around by the coast but it takes that long flight from preference. I had some curiosity to see how the plover compared as a flying machine with the best that man has yet been able to make in the form of an aeroplane. The fat in the bird's body is the fuel that is burned up to make the force that carries that bird on this long flight, and we know that that plover has at the outside not more than two ounces of body fat which is used by it for that 2,500 mile flight. Well, if an aeroplane was as good a flying machine as the birds, then a thousand pound aeroplane would need for making a 20 mile flight only one pint of gasoline.

I wrote to the officer at Fort Meyer who has charge of the U. S. army aeroplane and asked him what was the best that their machines had yet been able to do, and he wrote back that 1,000 lb. aeroplane for 20 miles would require a gallon of gasoline; that is a gallon for the machine as compared with a pint for the bird. In other words, the bird is eight times as good a flying machine as the best that man has been able so far to do.

The golden plover has a migration route of about 8,000 miles, but the one on the screen here now, the Arctic tern, has the longest migration route of any bird in the world. It nests way up in the Arctic; it is well called the Arctic tern because it nests just as far north as there is anything solid on which it can build its nest, and then it winters just as far south in the Antarctic as it can find any open water from which it can get its food. It lives on fish, so that no bird can have a longer migration route than the Arctic tern. It is about 11,000 miles from its summer home to its winter home, and it makes that round trip every year; that is approximately 22,000 miles a year, in its migration course. There is one little thing that happens from that, that the Arctic tern sees more sunlight, more daylight, than any other animal in the world. Because when it goes up to the north for its summer home the sun is already there and it has continuous sunlight throughout the four months that it is there; then it goes south for the winter and by the time it gets to the Antarctic the sun is also there and it has continuous daylight for the four months it is there, so that it has daylight for eight months in the year and part daylight for the other four months.

Now, in conclusion, I just have a few slides that I happened to have on hand that I thought would be interesting. This shows a robin's nest built on the top of a previous year's Baltimore oriole's nest, using that as the foundation and building its nest on top. This is the nest of the mallard duck, and it shows the down, you all know the eiderdown; the mallard has the same habit of plucking the down from its breast and laying it over the eggs when it leaves the nest to keep them warm while it is gone. There's a handsome

youngster; it is the great blue heron about six days old. I think this is one of the most artistic bird pictures I have seen, this herring gull just lighting down on the nest. And the last picture that I will show is the humming bird, and I want to particularly call your attention to a widespread misconception of the food of the hummingbird. You hear about it and read about it as visiting one blossom after another to get the nectar. As a fact, a hummingbird is not there for that purpose at all. The food of the humming-bird are spiders and it goes from one flower to another in order to eat the spiders that are down in the bottom of the blossoms.

MR. STOUT: As farmers, we are all interested more or less in birds, and we are advised to protect them, put up boxes for them to have a nest in. At the same time another class of people tell us to get our spray and get Paris green and arsenate of lead and nicotine and all these things and destroy all the insects. How are you going to protect the birds when you destroy their nourishment?

DR. COOKE: If you use the arsenate on the apple blossoms after the blossoms are falling but before the apple has turned, I don't think you hurt the birds.

MR. STOUT: But I have reference to destroying the insects.

DR. COOKE: Oh well, you kill all you can and there will still be plenty left for the birds.

The CHAIRMAN: Has any one any other questions to ask Prof. Cooke on this topic before we proceed? If there are no other questions, why it seems desirable while we are in this work, that we should take up at least a part of the afternoon program and Mr. Blyholder is here and I will ask him to come forward and occupy the Chair. We will certainly be pleased to have him do so.

MR. BLYHOLDER: Mr. Blyholder would certainly be pleased to have you remain right there.

DIRECTOR MARTIN: You can both sit there if you want to.

(Mr. Blyholder takes the Chair.)

The CHAIRMAN: I am certainly pleased to have the pleasure of presiding over such a bright and intelligent audience as this. We will take up the program as it is prepared for 2 P. M. The first subject we find is, "Some Orchard Insects and Their Control," by Mr. F. H. Fassett, of Meshoppen, Pa. I have the pleasure of presenting to you Mr. Fassett, ladies and gentlemen.

Mr. Fassett spoke as follows:

SOME ORCHARD INSECTS AND THEIR CONTROL

By F. H. FASSETT, *Meshoppen, Pa.*

It may seem rather dull and dry after listening to such an interesting talk on birds, to come down to the practical subject of the control of insects in the orchard. It has been my endeavor for the past 25 years to learn the best way and the best materials and the best time to control these insects in my orchard work. There are a number of different materials on the market that are being used, and to my mind many of the spray bulletins and spray calendars, without any criticism of these things, are misleading to the average orchardist or apple grower because of the fact that they give us so many remedies and so many different times of spraying that it would lead one to believe that we must spray continually in the orchard. We have found that for practical purposes of control of these insects, that we believe we can control the insect enemies of our trees and of our fruit with three sprays. There is, to my mind, a right time to spray and a wrong time. If we can do our spraying just at the right time, then we believe we can control so many more insects than when we do it at some other time. For instance, the spray for the scale—if we can do that spraying just at the proper time, then we not only control the scale, but we control so many other insects along with it. It has been customary to spray for scale at any time in the winter when the tree was dormant. We realize that at this time many people have more time to do the spraying than at some other time, but we have learned this, that if we can put that spraying off until the buds of our trees are bursting open, then there is not only the scale to control, but there are a number of other very injurious insects that we also control with this scale, making it an application not only for the scale but for a great number of other insects.

We have come to a time if we expect to get the best prices for our fruits we must control the insects in our orchards. In order to better understand how to control them, it becomes necessary for us to know something of their life history, that we may attack them at the weakest point. The study of insects offers a very interesting field for the orchardist; we can watch them as they go through the different changes in their life cycle. Right in our orchards we have two classes of insects to deal with; one class known as a sucking insect, which pierces whatever they are on and extract their food from it, consequently we cannot poison their food and must kill them with something that comes in contact with their bodies; hence these remedies are called "Contact Insecticides." There are several materials that are used for this purpose. The ones commonly used are soluble oil, lime-sulphur solution, and tobacco preparations.

The other class of insects are the chewing insects, or insects that take their food by biting. The potato beetle is a common type of this class of insects. For their control arsenic in some form is used. We believe for practical control of the insects in the orchard affecting the tree and fruit, three sprayings are all that is neces-

sary. The first spray is for the insects affecting the tree. There is no doubt that the soluble oil on the market has the greatest killing power of any of the contact insecticides. But in the use of the oil, there is an element of danger. If we always realize this and use it rightly we believe it can be used safely and with profit. It should be used on a bright sunshiny day so that it may evaporate off the trees as soon as possible. A very fine nozzle should be used and never hold the nozzle on any part until it forms in drops and runs down the trees. This is where the danger lies. Lime and sulphur solution is a much safer remedy; you may drench the trees with it and not injure them. The formula for the home-boiled solution is, 2 pounds of sulphur, 1 pound of lime, 1 gallon of water. Boil for about forty-five minutes or until the sulphur has all gone into the solution. Many growers are using the commercial lime and sulphur. As a rule it is more dense. Usually it is worth about three cents more per gallon than home boiled. In our work we use the commercial lime and sulphur as a contact insecticide. For an arsenic, we use the arsenate of lead in paste form. We believe it goes into solution better and sticks on the foliage longer than any other form.

The first spray should be made just after the buds have burst open. The materials used should be lime sulphur solution at scale strength and two pounds of arsenate of lead to each fifty gallons of material. We realize that it would be impossible in large commercial orchards to spray each tree just at the right time. But we believe that it ought to be as near to that time as possible. Because we can control the scale just as well then and we believe better, and we can also control a number of other insects as well. The green aphids or plant lice hatch from an egg laid near the bud and commence to feed on the tender tissues of the bud. They belong to the sucking insects and can be controlled at this time. The blister mite winters over in the scales of the bud and as soon as these conditions exist, they come forth and commence to feed on the tender leaves. These are also controlled. The cigar case borer which winters over in the larva stage, covered with a tough brown covering in the shape of a cigar from which it takes its name, as soon as there is food for it, comes forth and can be controlled also. The bud worm winters over in the larva stage; as soon as these conditions arise it commences feeding upon the opening buds and leaves. It is also controlled by this late spray. There are also a number of other insects that are controlled by a spray at this time.

The lime sulphur also possesses a fungicidal value and we also spray for such fungi diseases as apple scab, sooty fungus and other fungus diseases, spores from these disease will soon be loosened by the thousand. With the tree well covered with this material, the conditions are such that they cannot take root and grow, hence you see how important it is that this application should be made at the right time or as near as possible. The spraying must be done very thoroughly if we expect to succeed in controlling the insects. The second spraying should be done just after the blossoms drop, and before the lobes close up; this usually occurs eight to ten days after the blossoms fall. This spray is for the enemies of the fruit. The materials are diluted lime sulphur solution. One gallon of concentrate to 25 gallons of water and 2 pounds of arsenate of lead to each 50 gallons. It has been found that nearly all the larva of the

codling moth enter the apple at the calix end, hence it is necessary that we force our spray in the calix cup as well as to cover the foliage with spray. The egg for the first brood of the codling moth are laid on the leaves or some smooth surface near the cluster of apples. They hatch and probably feed for a short time on the foliage, then enter the calix end of the apple. It is necessary then that we cover the foliage as well as fill the calix cups with spray material. The operator should be on a tower or platform from six to nine feet high so that he can look directly in the calix end of the apple and be in a position to force the spray into the calix cups. This spray is not alone for the codling moth but there are numbers of others that we can control. The apple curculio, whose feeding punctures causes our apples to be knotty, also feeds on the foliage and we can control it. This insect is always worse in sod mulch orchards or where the orchard joins the woods, because these conditions offer ideal hiding places for them to breed. Clean tillage will destroy many of these insects and all leaf eating insects such as tent caterpillar, green apple worms, and canker worms will be controlled.

We still have a weak contact insecticide, which will kill all young scale. It contains fungicide for the further control of scab, sooty fungus, bitter rot, and frog-eye fungi. This is an important spray and should be very thorough. The third spray should be made about thirty days after the second. In an orchard where spraying has been done for years and a good system of orchard management has been maintained this spray may be omitted, but when necessary the same materials should be used as in second spray. If you have it at your command a little more pressure should be used. The eggs for the second brood of codling moth larva are laid where two apples touch or where an apple lays against a limb; hence it becomes necessary to force the materials up between the apples, and between the apple and limb so that the first feed of the little larva may be poisoned. If he gets one feed without poison he is beyond our reach and we are bound to have wormy apples. With these two materials properly applied at the right time and in the right way we can control the insects that infest our trees and fruit.

A Member: In using that lime and sulphur, is there any danger of its injuring the foliage of buds?

MR. FASSETT: We use the lime and sulphur solution—I might have said that we use what is known as a commercial lime and sulphur solution which is denser, or in other words, contains more sulphur than does most of the home-boiled solutions. The home-boiled solution usually registers about one twenty-four, while our commercial concentrates usually go up to about one thirty to one thirty-four, and if we use the home boiled, we use about one twenty-four—one gallon of the home boiled to twenty-four of the water; the commercial, one to thirty or thirty-five.

A Member: In using that lime and sulphur, is there any danger of its injuring the foliage of buds?

MR. FASSETT: Yes, when we are spraying as the buds open there is some danger of burning the first leaves that come out, but there's enough to follow, it doesn't matter, we may burn the first two leaves on that bud and yet we do no harm because there is

plenty of foliage that will push on out and we can accomplish so much with delaying that spraying that we believe it is important that it should be done just at that time, and while I realize that in the large commercial orchards it is not possible to spray every tree just at that time, yet we believe that every man who has a commercial orchard or a small orchard either, ought to so arrange his work that he can spray just as near as possible to that time.

A Member: One to thirty is entirely safe, is it?

MR. FASSETT: We have found it perfectly safe on our apple trees.

A Member: I know of an orchard adjoining mine, and my neighbor does not spray at all and I have quite a bit of trouble with scales developing there, and I wanted to know how strong a mid-summer spray I could use to control that trouble.

MR. FASSETT: With the commercial sprays registering about one to thirty two, I think one thirty is perfectly safe.

A Member: That would give you a density of one one?

MR. FASSETT: Yes, one one.

A Member: What time would you spray for the railroad worm?

MR. FASSETT: It depends on when the apples ripen. The apples ripen with us in September and the spraying should be done early in September or the last of August. The railroad worm usually affects the apples just before ripening.

A Member: There are only a few trees of the summer apples on which I have ever been troubled with the railroad worm.

MR. FASSETT: Well, if you could spray say 60 days before the date of ripening of that apple with this sweet material, it would go a good ways towards correcting it.

A Member: Have you ever tried spraying earlier to control the moth in her feeding? I mean the adult of the railroad maggot?

MR. FASSETT: Yes, with this sweetened spray that we were speaking of.

A Member: I mean doesn't she feed a little earlier?

MR. FASSETT: They do not, usually. I think the first appearance of the moth is usually in July or August; it don't appear early in the season; at least that is the life history we have of it.

A Member: I think that it does appear earlier than that, it certainly did in Rhode Island, I think along about June. Those eggs seemed to stay dormant for some time in the skin of the apple and don't hatch or at least the larva don't develop until the apple begins to ripen and soften, but many of the eggs are laid early in July and June in that climate.

MR. FASSETT: It seems to me a little earlier than we have learned to think they are here. In our own work, we never had any trouble particularly with that railroad worm or apple maggot. It might be that they would appear a little earlier than July here, but that is about the time we have learned to think that they are here.

A Member: Is it generally practical to locate the borer twice in the season—in the fall and spring?

MR. FASSETT: Yes sir.

A Member: I would like to ask you a question in reference to the June bug. I had four or five persimmon trees, and last year I have lost all the blossoms and all the foliage in a couple of nights; the June bug ate everything off and the result has been that I don't get any persimmons; and also I had a couple of propagated or grafted chestnut trees and the June bug took the foliage entirely off. How will I get rid of them?

MR. FASSETT: Why, they take their food by chewing and a spray of arsenate no doubt would control them, if you could get it on at the right time.

A Member: The damage was done so quick that I hardly know when to do it.

MR. FASSETT: The Chairman suggests that you go out and hold a lantern and let them run against it.

A Member: Does arsenate of lead lose its strength when it is kept from one year to the next?

MR. FASSETT: If it is kept covered with water, it will not, but if you should keep it in a vessel where the water leaks out, it is liable to lose some of its strength.

A Member: About the fourth or fifth of June, I discovered on a sour cherry tree, under the leaves, hundreds of little black insects that just came in there, it seemed to me; what are they?

MR. FASSETT: They are the aphids. There is a large family of those aphids, I do not remember just how many but a great many and that is one form of them that was on the cherry tree.

A Member: Do you spray for them?

MR. FASSETT: Yes sir.

The CHAIRMAN: The program is not completed yet gentlemen. The next subject is "Profitable Apple Culture," by Mr. Sheldon W. Funk, of Boyertown, Pa. I have the pleasure of presenting Mr. Funk.

Mr. Funk's address is as follows:

PROFITABLE APPLE CULTURE

By SHELDON W. FUNK, *Boyetown, Pa.*

Mr. Chairman and Friends: I realize very well the uncomfortable-ness of this room, and I assure you that I am not going to keep you one minute longer than is absolutely necessary. We are going to hurry through this as quickly as we can. If there is anything which comes along that you don't understand, or that I fail to explain, don't hesitate to ask me and I think we will be able to get through in very good time.

Owing to the fact that this last season apples have been selling very low, a great many men have come to the conclusion that there is no more money in the apple business. I have met a great many fellows who are getting very sick and claim that the apple business is going to be overdone; that we have overplanted the apple. Possibly we have. But we must remember that the low price this last season was not due alone to the fact that we had a rather large crop; but it was due more to financial conditions, because, when we look at statistics, we find that the crop was not overly large. Our crop this last season was about 41,000,000 barrels. In 1912 we had 47,000,000 barrels and in 1896 we have 69,000,000 barrels, so you can readily see that we did not have an exceptionally large apple crop, and still the prices were very low. But if you have overplanted, that does not mean that we are not going to make any money out of it. There is money in every business; it depends upon the management whether or not you are going to get it out. Nobody is going to grow apples at a loss; if you cannot grow apples at a profit, you are going to get out of the business. But the fellow who does stick, who does pay attention to all the things that go to make good apple growing, is going to make money out of apples.

There are two things that I think are very important in the growing of apples. First of all, I believe we have got to grow apples of the very finest quality; and, secondly, I believe we have got to be in a position to store those up and hold them until the market is right or as near right as we can get it. Any of you men who have watched the apple market during the last number of years have noticed that almost every year apples have gone up a little bit late in the season, and the man in a position to store his apples and hold them till that time usually made some money out of them.

Let's have the pictures. I am not going to take up that side of it, but just bring out a few slides about the culture of the apples and we will skip along rapidly. The first slide shows the first operation in the digging of nursery stock. You have four mules fastened to a long knife like arrangement that goes underneath the ground and cuts off the roots of the tree. This shows the tying of the trees into bunches. Two straps go over the tops and are drawn tightly together. This shows several troubles of nursery stock. The upper one is the woolly aphis which Mr. Fassett explained to you. Down here we have crown gall and down here we have two demonstrations of hairy root. Whenever you find either of these conditions on your

trees, I would burn them or destroy them. Mr. Fassett explained the wooly aphids to you. Here we have a slide showing a cover crop of hairy vetch and rye. You will notice two small boys in here and it will give you some idea of the height of the cover crop. In my estimation, it is the coming cover crop for the State of Pennsylvania. I don't believe that anything will give as good results as hairy vetch and rye.

A Member: You stated when you were down at our place that a good thing for us to plant as a cover crop was buckwheat; if we sow that buckwheat early, won't it be self-seeding and won't we have trouble with mice?

MR. FUNK: I made the statement in this way. That on your Lancaster county soils, where you have limestone and are trying to grow peaches on the limestone, you usually have a good bit of trouble in the ripening up; your wood—the trees grows a little too long in the season, makes too much wood growth.

A Member: But this is in the apple orchards that we are speaking of.

MR. FUNK: I recommended the buckwheat on the peaches more than anything else to help ripen the fruit; at the same time you could harvest the buckwheat and secure a partial crop, but when it comes to the apple orchard I would rather have the hairy vetch and rye and I recommended sowing another cover crop like crimson clover which you can use with the buckwheat and when the buckwheat was harvested, the other would come on.

Here we have a slide showing the starting of the apple orchard with the sod mulch system. The orchard is sown with rye; the rye, about the time it comes to head, is cut and placed around the tree as mulch. It is one of the best ways I have ever found of getting a large amount of mulch. To begin the sod mulch plan in the young apple orchard, here we have the spring tooth harrow, with steel frame in it, which is used in cultivating low headed apple or peach trees. This frame can be removed. One section of the tooth goes underneath the trees and elevates the soil underneath, and then after we have cultivated the entire orchard in that way, we take out the frame, put the harrow together and cultivate the remaining portion.

This frame should be of the same width as the spring tooth when the two sections are together. Here we have a one year old apple tree, that is planted one year before pruning. Here we have the tree after it has been pruned. You will notice that we only have left three branches; I don't like to have more than three or four. You will notice also that the head is well separated. These are rather close together, but that does not make any difference because we have the other part in the top and that head will never break. If the three came out at one place, there would be danger of its breaking. We have cut them back. I like to keep them even over the top, because it makes a nicer, rounder tree.

Here we have a three year old tree before pruning. This was the first year's growth cut to the second year, cut to here. I believe in cutting up trees to one year, that is cutting to the outside buds, you

notice as they were cut here. The next slide shows the tree after it has been pruned. We have thinned out these branches, getting our leaders, but we are not cutting back this year. We cut back for two reasons: First, to stouten this part there; secondly, to spread the head. Now we are going to let this tree branch because it will branch right here at all the terminals, and then the following year, if it needs cutting back instead of cutting to an outside bud, we will be cutting an outside branch; that will spread the tree faster and give fruit sooner. Here we have a slide taken in Clarion county showing the tree before pruning. We had to cut the tree out very hard to establish our leaders; that meant that there were no small limbs in here and it leaves the tree very bare. I simply give these two slides to show what you would do with a tree of that age that had never been pruned.

Here we have a five year old winesap in full bloom. It has been pruned, as is shown in the other pictures. It spreads nicely, is not thick in the center and is not very high. The next slide shows the tree with the apples on it and gives you an idea of what the stamen winesap will do at that age. Here we have a seven year old smokehouse, a very beautiful tree, one of the most beautiful I have ever seen in the State. That is in full bloom. Here we have a seven year old stamen winesap. Some of these pictures were taken in my own orchard; the others were not. There is a tree that picked about four bushels of apples, seven years of age, and all the apples were first-class and perfect.

This slide shows us the way not to prune an apple tree. You will notice that this picture was taken just after the man had finished; you can see the branches, the limbs, lying down here in the snow. He left several stubs here to hang up his coat or hat in the fall when he went out to pick apples, and that is a thing we don't want to leave. This is the thing that has given us all of our rotten trunks. You often find apple trees with rotten trunks and it was due to the fact that at some time the man who went out here to prune left a stub of that kind. If a limb is cut close to the collar, it will always heal, but if you cut it that way, it will never heal. The rot fungi start in here and work back through the line and down into the trunk and the result is that the tree is permanently injured. Here we have a tree pruned differently. It shows a 20 year old start. This picture was taken just before pruning and not after and the result is we have quite a number of small branches that should come out. I have given you the slide to show the build of the tree. This is another tree in the summertime; it is just as easy to grow trees of that kind as the one I showed you several slides back. The only difference is in the treatment. We find in the State of Pennsylvania a great many old apple trees that have been almost killed by scale; all of the upper branches have been cut off and now the question is how are we going to renew those trees? We don't want to cut them down, because the trunk is still good, and if we can renew it in about three years we will be having apples.

Here we have a tree just before renewing it. You will notice on this tree that the water sprouts have started; if those water sprouts had not started we would not dare cut it back the way I am going to cut it back here; it would be necessary to leave in some of the branches. The next slide shows the tree after it has been cut back,

and we can make a new tree. If we had not had the water sprouts, it would be necessary to leave in some branches for shade and to prevent sunscald. Unfortunately we have trouble with some of our nurserymen and oftentimes it is necessary to graft and bud over limbs.

We want to know a little bit about budding or grafting. Here we have some of the tools used in budding and some cuttings showing the apple and currant cuttings that are made to be placed in the spring. Here we have the operation of budding. You can bud almost any kind of a tree and we must bud the peach tree. Grafting does not work well on the peach tree and does not work well on the cherry. I prefer to bud cherries and apricots also, but the other trees we can graft. This is the first operation we make, splitting the bark. You make an up and down cut and then a cut across the top and if it is made about the end of July, the beginning of August when budding should be done you will find that that bark will spring loose. Then we cut the bud in this form. The bud looks like that after it has been cut. That bud is taken and slit down in between underneath the bark and then tied with something like raffia, or if you don't have raffia, take cloth of any kind and tie it tightly, leaving the bud exposed, and in about three weeks the bud will have grown fast and next year you cut off the tree above the bud and the bud will start to grow. There we have root grafting, the same operation as what is known as whip grafting. You notice this is your scion. Make the cutting that way and slip it. This is the stock and that scion is slipped into the stock in this way, tied and a little bit of wax placed around the graft and it will grow very easily. The bud need not be waxed. This must be waxed. Here we have several other grafts. This is the cleft graft, the graft we must always use in larger limbs, and you will notice, most of you are acquainted with this graft, you split the limb.

There is one thing I want to call your attention to, I would always have a bud at the shoulder right there and always be careful to cross the cambium just a little bit. You will notice that these scions are not put in straight up and down, they are crossing just a little bit. If you will remember that, you will never have the least bit of trouble in getting grafts to grow. Over here we have what is known as the bridge graft. Sometimes we have trees girdled and don't want to lose them and can oftentimes save them by putting in a bridge graft. This is the way you make your graft. Both ends are cut a little and then you split the bark here, insert one end here and another there. It is well to place a small tack in each end and wax it as you see in this illustration here. That is a rather hard operation, but oftentimes we can get them to grow very easily and save the trees in that way.

Here we have a young tree that has been top grafted, a six year old tree, that turned out to be a wild tree, so we put on another variety and you will notice we have grafted four limbs and then left these side limbs for shade. In two or three years all those side limbs will come off and we will have the new top coming on there. Here we have an old tree that has been top grafted. It shows one year's growth. This picture was taken this spring just after the leaves had come out. The ends of the limbs have been grafted and on the side of the tree we have some water sprouts

growing up that we have left there to grow for shade. Eventually all those water sprouts will come out and we will have a new tree. This shows a twenty-year-old gano at home, and there is one thing I want to call your attention to and that is that it was necessary to prop this tree, due to the fact that it had not been thinned properly. If the tree had been thinned properly, there would have been no occasion for the props. Here we have a stamen winesap of the same age. You will notice that that tree was thinned properly and no props are needed, with the result that the apples are a great deal better on a tree of that kind.

This is a slide showing the work of the apple leaf hopper. It is a serious trouble, but oftentimes you will notice it working on your young trees disfiguring the leaves in that way. I merely give you the slide so you will be able to recognize the trouble. It is not serious. You don't need to pay much attention to it. Here is one of the most serious apple or pear or peach diseases in the State of Pennsylvania, that is the fire blight; it is the worst disease we have in the southern part of the State, doing a great deal of damage. You will notice all these dead twigs here have been blighted. The only thing we can do is to cut it back, cut out the dead twigs. Always cut back into the new wood and then watch your fertilization. You will find that the trees fed too heavily with nitrogenous fertilizers will always blight more than a tree not fed so heavily. This is a slide showing the codling moth. Mr. Fassett explained that and I will not waste any time on it. Here we have a sprayer that does very good work in a hillside orchard. You will notice the wheels are very low and you can spray on a steep hill before there is any danger of the machine toppling over. This is the last slide and shows the finished product. That is the kind of apple that we grow when we do everything just right. When you have apples of that kind, you have no trouble in disposing of them and you have no trouble in finding a market and always at good prices. Let's have the lights, please.

Now we have a few minutes more and there are one or two things I would like to take up because I believe they are rather important, and we have gone over this cultural proposition here very rapidly; but there is one thing I want to bring up in particular, and that is, if you are going into the apple business and you are going to take care of those apples, let's do all of the operations right. I believe that is very important. During the last six or eight months, I have spent considerable time in looking up the cost of the production of apples, and I have written to quite a number of men, I have spoken to quite a number of other men, and I have figured out the following costs.

Now I know that you people are not going to agree with me, that is not all of you, because perhaps under your conditions it will cost more or it will cost less, but remember that these are average conditions for average varieties; and the point I want to draw out is that the cultural operations, the growing of the fruit, costs very little compared with the marketing of it. Now these figures are taken on 20-year-old trees. The average cost of producing a barrel of apples is about 29 cents; that is counting the labor, all of the labor and the material used in the orchard, such as fertilization, cultivation, cover crops, thinning, spraying and pruning. I am not

counting the interest on the investment, insurance or anything like that, but simply the labor and the material that goes into the orchard to grow the crop. We are not counting picking or packing, and these are as near as I can come to the figures: The cultivation and the cover crop, about five cents per barrel; fertilizers, about five cents; spraying, four cents; pruning, six cents and thinning nine cents. Now those figures are all high compared with most men, but there you see we have 29 cents to grow the barrel of apples. Then we will follow it a little bit further, taking 15 cents for packing, 15 cents for the barrel, including freight and hauling, 45 cents; including freight, storage, etc., we have a total of \$1.20. Now after we have got the barrel of apples ready for the consumer, it has cost us \$1.20. And here is the point, in order to make it pay, I believe we should do all of those labor processes right. I know a great many men in the State of Pennsylvania that are good sprayers, they are good cultivators, they are pretty good pruners, but they fall down on fertilizers and fall down still harder on thinning.

A Member: When do you start to compute that cost?

MR. FUNK: That was about eight months ago.

A Member: I mean at what age of the tree.

MR. FUNK: This is a 20-year-old tree. Now a young tree will cost more than an older tree perhaps a little bit less, but this tree is 20 years old. I say more of us fall down on fertilizers and still more on thinning. I believe that more trees are dying to-day in the State of Pennsylvania because they are starved to death than because of anything else. We find it everywhere and I say I believe that we ought to fertilize a little better and we ought to thin a little better.

Now we will take the fertilization again. Paying five cents a barrel for fertilizer, you will be able to keep that tree growing in first class condition; you will be able to have it make as much wood growth as it should. I like to have on a tree of 20 years of age anywhere from 8 to 15 inches, and that is the best sign that I know of to tell us whether or not we are treating that tree rightly. For nine cents we are able to thin that tree, and we will take up the importance of thinning a little bit later. Last year I sold quite a number of apples right out of the orchard. Apples at that time were selling at 35 cents a bushel, that is apples that had been picked and sorted and put in the bushel boxes, not packed, understand, simply put in the boxes, 35 cents a bushel and I sold my apples the same way, no sorting, right off the tree, for 70 cents a bushel; in other words, apples were selling for \$1.05 a barrel and I got \$2.10 a barrel for my apples in the same condition. There was a profit of \$1.05 made entirely on those twenty-nine cents because the picking and the packing and the sorting and everything else on good apples does not cost a cent more than on poor apples; in fact the picking and packing of poor apples costs more than the picking and packing of good apples. Now can't you see that? Most of us think it costs too much to thin, we cannot afford to put on enough fertilizer, we cannot afford to spray as thoroughly as we should, or we cannot afford to cultivate as often as we should, but you can see

at once that the labor cost is very low and if, on the twenty-nine cents I was able to make \$1.05. I think it was pretty good profit and I believe we ought to do every one of those operations just right, we ought to give that tree just as much fertilizer as it should have; we should spend just as much in pruning as necessary; we should spray it just as well as we possibly can; pay no attention to the cost—except that I try to do economical work—and then last of all I believe we should thin all of the fruit.

I am just going to waste a few minutes and take up the thinning proposition, because it is an operation that must be done now within two to four weeks, depending upon whether you are going to thin plums, peaches or apples. It is the one operation I have found in the State of Pennsylvania has been neglected more than any other operation. Most people have an idea that it is all right; but they are from Missouri and you have got to show them, and the only way they will find out is for you to go into their orchards and show them by pruning one or two trees. I don't believe you can ever get a man to thin his old orchard the first year. First of all, you want to begin at the right time and that is when the apples are about the size of a quarter of a dollar, as soon as you can handle them nicely. Peaches we thin just after the June drop. I don't want to pull off those apples with my fingers because I will take off a great many of the fruit stems and injure next year's crop, and if I have a cluster of four, I will injure the fourth so it will drop also. First, take a small shears and clip the stems; secondly, take the poor ones, then the small ones and then take the good ones until they stand six or eight inches apart and do that over the entire tree.

That is where you are going to have trouble. A fruit grower never gets it in his head that one apple four inches in diameter will weigh as much and make as much as eight apples two inches in diameter; I repeat that one apple four inches in diameter will weigh as much and make as much as eight apples two inches in diameter. Where you have a limb growing eight apples ordinarily, two inches in diameter, you might as well have a limb with one apple on it four inches in diameter; it is not only worth more, but it is not nearly as hard on the tree, because we all know it is the development of the seed and not the flesh that drains upon the vitality of the tree. The flesh of an apple does not drain the vitality of the tree; it is the seed and that is the reason why, when we leave all these apples upon the tree we have so many more seeds and get a crop every other year. That is very common in a great many sections. We have a heavy crop of apples this year, next year nothing, the third year a heavy crop again, and so on, simply because when we had so many apples, it drained so hard on the vitality of that tree that there wasn't sufficient energy left in it to develop the fruit buds next year and the tree had to lay off one year to develop the fruit buds. Thinning will not always give you a full crop every year; you must have the right varieties. But you take a Roman Beauty or a Stamen Winesap and thin it hard and unless you have cold weather, if you treat the tree right you will find that you will get a good crop every year. The Baldwin is one of the trees that won't do it, and still in Lebanon county I was shown something there that proves very well what thinning actually will do. I visited a man one day and he took me out into his orchard

and there he had a great big Baldwin apple tree and he said, "There is an apple tree that last year was so loaded down with apples that I thought it would break to pieces. At the time I should have gone out to thin it, I was ill, I couldn't get out of the house, but one day my wife came out and thinned that tree as high as she could reach from the ground, went all around the tree on the ground and thinned off the apples as high as she could reach, and when I went down that summer the limbs were so loaded down that they had to be propped up all around the tree, and from there to the top of the tree there was scarcely an apple on the entire tree—from as high as you could reach from the ground."

I don't want you to go home and try to thin the whole orchard, but thin a few trees and thin them until you think you have taken them all off. Better not do it yourself; better hire some other fellow, because you will never thin them hard enough. I never do any thinning at home because I can't. I like to get a good bunch of boys together, boys of 15 or 16 years of age, active and not afraid to get up on a ladder, take those fellows out in the orchard and show them just how I want it done and I stay there just long enough until I see they are doing it right, and then get out. If we stay around we will always have too many apples on the tree, but if I am gone they will do it right. Those fellows don't care; if I tell them to take off all the apples, they will take them off, it don't make any difference to them, but it would to me and I can't thin an orchard as well as some fellow who is paid to do it. I thank you very kindly for your attention.

Recess until 2 P. M.

THURSDAY AFTERNOON

THE CHAIRMAN: Ladies and gentlemen, the time for the opening of our session has arrived. We will start the program where we left off in the forenoon, and I take pleasure in introducing Mr. Daniel Dean, President of the New York Potato Growers' Association, Nichols, New York, who will talk to you on Potato Growing and Seed Selection.

MR. DEAN: Ladies and Gentlemen: This is my second experience in talking to a Pennsylvania audience and I have been my whole life a farmer. My first work on the farm that I ever did was when I was a school boy, covering potatoes with a hoe, and from that time on I have been raising potatoes all the time. Now, the potato crop is one of our most important ones and has many different peculiarities. It comes to us from quite a different climate from what we have here in Pennsylvania. It comes from a climate which is cool, in the mountains of Peru, moist, and the sun is not severe. It developed, under those conditions, a different form of leaf, a different form of root, from what would be the right thing to cope with our conditions, and consequently, we have to study the plant and its habits, in order to adapt it to our conditions and to adapt our conditions to the potato plant. It has been found that

heat above a certain degree is very injurious to the potato, and when that degree of heat is raised, the vitality of the potato and its vitality as seed for the coming year is badly injured. The leaves of the plant do not stop transferring moisture, as many of our plants do, when the heat becomes excessive and the plant has practically exhausted the soil moisture, but keeps on transferring, and we get the condition called sun gall, and great injury often results. The potato plant is able to stand a degree of acidity which most of our other farm crops can not. In Europe we have conditions more similar to those of South America than here. The season is longer and the climate is cooler.

Mr. Dean then presented the following paper:

HILL SELECTION OF SEED POTATOES

By DANIEL DEAN, *President New York Potato Growers' Association, Nichols, N. Y.*

Seed selection is now attracting more attention than anything else about potato growing. Its value has been proven by very accurate experiments extending over several years at a number of experiment stations. Many farmers have found seed selection to be one of the most profitable parts of their work. I was one of the first in the United States to use it, beginning in the fall of 1904 by digging about 300 bushels with hooks and saving the best hills. The following year this selected seed gave an increased yield and greater market value. I have found the profit from seed selection to be even more from the increased sale value than from the better yield. The cost is very small, consequently the net profit above cost is large in proportion.

We are always on the lookout for some new variety which should displace those we have now as these in their time drove out the Burbank and Early Rose, themselves successors to now forgotten varieties. Many thousands of new seedlings have been, and are constantly being tried out. From these a list of less than a dozen varieties can be made out which are superior to all the rest. The chance against getting a new seedling variety better than those we now have is in the same proportion of thousands to one.

We have always thought of a potato variety as something unchangeable, though with also the belief that sooner or later it must "run out." Seed selection has now proved that varieties are made up of many separate strains, differing more or less, with further variation going on most of the time. From these variations within a variety we can select and keep up a strain having the particular qualities most suited to the needs of any grower, in the same way that we now select the variety most suited to our conditions. It is now believed that unless a variety is grown under unfavorable climatic or other conditions that it will keep its vigor indefinitely. One variety has been grown in Sweden over one hundred and fifty years.

Conditions in the United States are often poor. In their original home in South America the growing season was long, wet and cool.

The tubers were small, and but little drain on the strength of the plant. Out of the many thousands of varieties produced we have kept for our use only those that produce very heavy crops of tubers in one half or one third of the time required by the original potato plant. In connection with our hot and dry climate this throws a very severe strain on the vitality of the potato. It is not strange that some plants break down and produce tubers nearly worthless for seed. In northern Europe the great ocean current, called the Gulf Stream, makes the climate much more favorable to the potato than here. Yet differences in vigor are seen even there as tests between seed from the north and south of Great Britain show. In our South the summer heat is so great that potatoes maturing at that time are nearly worthless for seed. When planted in the same section so as to mature in the cool weather of fall, good seed results; the so-called "second-crop" seed. Even as far north as Ottawa, Canada, dry and hot weather in 1906-7-8 ruined the varieties grown there. *I believe that growers should study every possible means of maintaining vitality of potatoes in hot and dry seasons.* Not only is the crop reduced at a time when prices are highest, but the seed is injured for the following years.

We find that our varieties are constantly developing new strains in each, some valuable and some degenerate. We can prevent injury and store up vitality by growing them under as favorable conditions as possible. Then by the use of different methods of seed selection we can find and use as seed each year the best yielding and selling strain of the variety most suited to our climate, soil and markets.

Many experiments show that when the tubers of any hill are used as seed each has a strong tendency to resemble the parent hill in all its qualities. Every potato grower is consciously or unconsciously changing his varieties, either for better or worse. A number of methods of choosing seed potatoes are in use. Having never seen any comparison of the merits and defects of more than two or three together I will try to present a fair discussion of the whole subject.

THE USE OF SMALL SEED

By carefully digging a field of potatoes it will be seen that a few of the poorest hills produce a larger proportion of the small tubers. The best hills produce mainly large ones. Diseased hills are almost certain to have a light yield and the tubers mainly small. I have selected hills for seed for 11 years, always choosing the best yielding. Now I get less than 2% or small in good seasons, even though the hills are planted only a foot apart to produce the medium sized stock demanded by city markets. I do not feel that the reduction of the small tubers till there not enough to plant the next year's crop is a serious objection. Farmers use small seed because it is cheap. While it is possible that the increased yield from the use of large seed might not pay the extra cost, the use of small seed year after year increases the proportion of weak and diseased hill, the yield diminishes, and the variety is said to be "run out." Many scientific experiments have almost always shown better yields from large than small seed when sorted in the usual way. The Geneva Station has made a test in which care was taken to have the large and small tubers taken from the same hills in order that the inherited

vigor might be equal. Under these conditions the small seed was at least as good as large pieces of equal weight. While an exceptionally all the best hills in a field of tubers longer than the usual variety of bad season might produce many weakened hills with small tubers small seed may be considered safe if taken from a stock from which the weak hills are kept eliminated by some method of seed selection.

THE USE OF LARGE SEED

This produces a better crop and better seed at an increased cost. Often farmers buy new varieties which produce well at first because the seedsmen have grown them using large seed and have had good winter storage conditions. The yield often falls down as soon as handled under the usual farm conditions.

SELECTING SEED ACCORDING TO AN IDEAL TYPE FOR EACH VARIETY

This plan would be of immense value if we were certain just what points in the appearance of a tuber were reliable indications of its value as seed. The Uncle Sam variety varies all the way from smooth flat-oval shape to a longer and rougher type, the vine, flower, etc. being the same. I once selected the hills which were smooth, discarding those longer and rougher. The yield compared to other varieties declined so rapidly that it was apparent that the poor looking hills were the ones that had given the yield. With the Rural this same smooth type is found in the best hills and is the best seed. Tubers longer and narrower than the usual type of any variety are to be regarded with suspicion in most years, especially if the eyes are longer than usual and clustered closely around the seed end. Prof. C. L. Fitch, in Iowa Extension Bulletin, No. 20, states, that "Flatness and relative shortness are the result of healthy growth and signs of strength." One exception I have noticed is that in seasons like 1909 and 1912 when a long drouth was followed by plenty of rain after the tubers had reached their usual shape, I have seen all the best hills in a field of tubers longer than the usual variety of type. Where seed selection was not practiced by neighbors the enlargement took the shape of knots or prongs. The poorer hills died earlier and their tubers were of the usual variety type. When these best hills were used as seed the following seasons the shape went back to normal. Prof. Wm. Stuart, of the National Department of Agriculture, states, that shape is often affected by the nature of the soil and culture methods as well as the season. So for the present we are not warranted in depending too much on any rigid type as a means of selecting the best seed potatoes. Any one making a tuber-unit test will be greatly surprised at the variation between different units although the seed tubers may have been as near exactly alike as it was possible to select from the bin.

MARKING AND SAVING HILLS WITH LARGE TOPS

The large tops are often believed to indicate large yield. While this is often advocated and appears at first thought very probable, I have never been able to find any scientific experiment in which seed from hills with large tops was compared with that from hills judged on the basis of yield and appearance of tubers. My own experience in 11 years of seed selection with a total of over 50 varieties is that

hills with large tops are seldom the best yielders. Selection on the basis of yield has practically eliminated the extra large tops. Prof. W. A. Orton, one of our best potato disease experts believes that large and late growing tops may be an indication that the plants have been injured by the heat. I have found them in blue-sprout, white-sprout and Irish Cobbler varieties. Usually each hill has a small number of very large potatoes which are coarse, deep-eyed and often hollow. As these are almost unsalable in large cities, this is another objection to saving hills with large tops.

BLIGHT RESISTANCE

A few years ago there was demand for blight resistant potatoes. Sometimes these late growing hills were saved on that account. One of the best potato bulletins we have, Ohio No. 218, by Prof. F. H. Ballou, states, that "Experiments coupled with many observations suggest that little is gained by selecting parent hills on the basis of disease resistance of the plants over selecting parent hills because of superior individual yields. It is the actual work done within the hill that should most interest the potato breeder. The later growing hills simply demonstrate that there develops, through natural plant variation these tardy, deliberate, slow-maturing strains which we should not mistake for strains of special disease resistance. At the Vermont Station hundreds of varieties have been tested for blight resistance. Few showed much, and these were commercially useless from other defects in yield, shape, etc.

SELECTION ON THE BASIS OF A PARTICULAR NUMBER OF SALABLE TUBERS TO THE HILL

Practical growers know how the number set in each hill varies with each season. In 1914 the set in my field was small, and the tubers large. In 1905 there were too many in the hill and the crop ran small. In 1910 one field had a small set and another planted with the same seed the same day but with a light sandy soil set nearly twice as many to the hill.

EARLY REMOVAL OF WEAK AND DISEASED HILLS

Most potato diseases reduce the yield of the affected hills. Removing hills with fusarium wilt, black-leg, leaf-roll, curly-dwarf, etc. leaves a healthy seed stock which will give a better yield the next year than if the diseased hills are left. Particularly is this true where small seed is planted, as diseased hills produce many small tubers. Some of these diseases also infect the soil and attack potatoes for years after. This digging must be done before the healthy tops die. Work is usually not pressing at this time. The extra expense is small as these hills would have to be dug and picked up later anyway.

THE TUBER-UNIT METHOD

Good sized tubers are taken from the bin of as near the same size as possible. These are quartered lengthwise and planted in adjoining hills. When dug all are piled together. This method has an advantage over any other in that one can begin in the spring and have clear proof of seed transmission of plant characters the same season.

This method of quartering all seed is objectionable after the first year because of different strains varying greatly in size. The quarters from the strains which have only a few large tubers to the hill will give a better start to their plants than those from the strains with a larger number of medium sized tubers to the hill. As these large potatoes are worth less per bushel, this method increases the proportion of poorer yielding and less valuable potatoes. There is also considerable labor and trouble in keeping units separate. Other objections are that some growers are liable to pay more attention to getting a particular tuber type and to large vines than to yield and sale value.

DIGGING BY HAND AND SAVING THE BEST HILLS

This is especially adapted to the immense proportion of our crop dug by hand. Where machine diggers are used the seed should be dug before the crop is ripe enough to dig without bruising by the machine, unless late blight is known to be in the field. In that case the seed may be dug later on days when the ground is too sticky from rain to use the machine. It is certain in Europe and probable in this country that immature seed yields better than that allowed to become fully ripe. The only extra expense over ordinary hand digging is a little care in keeping hills separate and that of going over the rows and picking up the best hills first. While some may be better because of a better chance on fertile spots it is very unlikely that any seed will have the same luck two years in succession. So the second year will throw out all except those that yield well because of their inherited vigor. Farmers can be persuaded to use this method because it involves less change from their present methods than any other. As the number of hills worked with is limited only by the size of the field the chance of finding the very best strains is increased.

HILL-UNIT OR HILL-ROW SYSTEM

Planting a short piece of row from the produce of each hill or larger unit is the most accurate method for scientific work and for farmers who have the time for caring for several hundred strains. Field methods of cutting seed must be used as the results are more reliable for farmers' use than where the tuber-unit method of quartering is used. With any strain the pieces must be of equal average weight or the tests are worthless. From each strain a similar amount, say one bushel to the short row should be saved for comparison. The whole of the produce of the best strains should be saved to produce seed for the main field crop.

PRACTICAL POINTS

Before beginning seed selection a grower should first make sure that he has the type and variety most suited to his climate, soil and markets. Eastern city markets pay the highest prices for flat, round to oblong white potatoes of medium size and good cooking quality, smooth, without disease and free from second growth shown by knots and cracks. Red varieties may be sold in summer. While others may do well in some seasons the Rural type of blue-sprout varieties do best from New England to Minnesota, including most of

New York and Pennsylvania. The Green Mountain or white-sprout type is best in the cooler climate of Maine and northern New York, and does well further south in cool and wet seasons. Burbank is raised on the Pacific coast and the Pearl, under irrigation, in Colorado. Irish Cobbler, Bliss Triumph, Green Mountain and other varieties are raised in the north to be sold in the south for seed.

It is necessary to test new varieties at least two years because of variation between seasons and because they may have been kept under different storage conditions. The seed selection can be begun with all the first year and all but the best variety discarded.

Any score-card of points may be used in the selection of a type, variety of strain according to the wishes of the grower. With most of us net profit is the thing to be most considered. This may be produced in different ways. For early markets, extreme earliness pays better than high yield on account of high prices. Quality and white color are also less important than with the late main crop varieties. Freedom from disease must always be considered unless like scab it can be prevented by disinfection. High yield, good appearance and table quality are almost always the largest factors in securing the greatest net profit.

Beginners should use spring scales until their eyes are trained to judge the weight of hills with fair accuracy. At first a hill with a few large tubers will appear to the eye to be heavier than one with a larger number of the medium sized tubers that sell better. Large size is a bad defect for city trade. There is some danger in trying to work against the usual type of a variety as I found in trying to select a smooth type of the Uncle Sam at the cost of reducing yield. Shape may be affected by the season, character of soil and culture methods. Small tubers may be expected in any hill. Some varieties like the Irish Cobbler normally have a numerous second setting, at least with me. Weight of salable tubers should determine judging, disregarding small ones unless many more than usual. Any mixture of varieties should be thrown out. One is the best for any one set of conditions and only that one should be kept.

I never saved any poor hills to test till 1912. That year the low yielders row averaged only 70 bu. per acre against 350 for the adjoining rows treated exactly the same. In 1913 the low yielders averaged 150 against 290 for the normal. This was not a fair test as the low yielders were mature when a frost, September 14, killed the others while in full growth. In 1915 the yields were 74 and 334 bu. per acre. In some seasons low yielding strains may be told by a longer and more pointed shape than normal.

I dig about one acre out of 17 each fall with hooks, either before the rest are ripe enough to dig with a digger or on days too wet to use a machine. Each hill is kept separate. Next I go over the row myself and select 5 to 20% of the best hills. This is the hardest part and requires the best judgment. These selected hills are planted the next year in a seed plot on the best part of the field, if necessary extra care should be given. The soil should be one holding water well for times of drought, the time when seed vitality may be injured. Early in the fall and before the tops on the healthy vines die, a hook should be used to remove all weak, early, dying or diseased hills. This year I found only 4 bushels of such on 5 acres yielding 1,810 bushels. Small tubers from such a plot are as good as large but there are not very many.

Owing to the different parts of a field varying greatly in yield it is better to take a percentage of the best hills rather than to use a rigid standard of weight over the whole field. This percentage should be higher in the good parts than where potatoes are poorer because of possible injury to the vigor of seed from poor parts of the field. In case conditions are so poor that degeneration takes place it would be best to save only from the best part. Seed selection cannot prevent loss of vigor, but it can quickly eliminate the damaged strains unless the injury is so severe that all are affected.

Scientists are not agreed as to whether the yield of a particular strain can be increased by annually selecting the best hills. It is regarded as certain that the average yield of a variety can be increased by finding and multiplying the best strains within the variety. As a farmer I am well satisfied that this can be done with profit by using some of the methods here given. The cost is so small that every hour spent is well paid. I believe that I have received greater returns from the time used in seed selection than in any other thing done on the farm.

A Member: You spoke of a yield of 2,200 bushels per acre?

MR. DEAN: 2,240, I think, is the European record, per acre. The Maine record is somewhere around 1,000.

A Member: Has it been tried out which is best, to plant early or late?

MR. DEAN: No two seasons are alike. What might be right one season would be wrong another, but I think you would get by far the best seed by planting late. The seed which matures in the extreme hot weather of the South, or possibly in southern Pennsylvania, is maturing under conditions not favorable for the vitality of the potato to plant the following season, but the seed which matures in October is maturing under much more favorable conditions. In the South they get a seed practically equal in every way to the seed imported from Maine, and to store up vitality and plant an abundant supply of humous in the soil in any way in which you can obtain it is very essential. This humus supplies plenty of water for the plant and by its use plant food is made very readily available, and so the plant is enabled to pass through the most dangerous period of its life. The methods of cultivation which I find very successful are fall plowing, turning under a large amount of oat straw—oats and clover—turning under a heavy clover sod. If you can't grow clover, grow heavy timothy sod or red top; that is better than nothing. You need a large supply of humus for the potato plants.

A Member: Do you know that the red top roots will grow right through the potato?

MR. DEAN: I am speaking of snake grass.

A Member: I know; I have had experience.

MR. DEAN: The largest crops I ever got were on the red top soil. I have never had that trouble with it.

A Member: Would you prefer turning the clover sod in the fall or in the spring?

MR. DEAN: Personally, I would prefer the fall, and under your conditions so much further south now mark you, I am over the State line in the middle of the north, and in that climate I can afford to leave my ground bare over winter. So much further south, bare ground open would be a serious matter, wouldn't it, Mr. Martin?

DIRECTOR MARTIN: We regard it as such.

MR. DEAN: On the other hand, the great disadvantage of a cover crop is that there is so much temptation to get humus growth by letting the cover crop stand. I disk the cover crop up the first minute it will stand the horses' feet and keep on saving that moisture the whole spring, because I need every bit I can get. In regard to other methods, spraying potatoes in New York State is a very good method of conserving vitality. Now, I am not able to find whether in southern Pennsylvania there has been any extended experiment, definitely, to find out whether we get here what is certainly found in New York, a tonic effect or Bordeaux mixture. Certainly, in the latitude of Geneva, Bordeaux mixture has an effect in dry, hot seasons, very largely increasing the yield of the potato crop, and this in addition to the saving of late blight. It is another proposition entirely, and there is a third plan of spraying, that by the use of Bordeaux and Paris green together we can kill bugs cheaper and easier than any other way. Now, as I see, this is a very intelligent audience, and I will make a statement I do not often like to make in public; I have used 70 pounds of Paris green on potatoes in four years and scarcely seen a potato bug, but applied in connection with Bordeaux, half a pound an acre is enough. The Bordeaux spreads it all over the leaf and sticks it there, and applied in connection with Bordeaux, there is no burning from the acidity of the Paris green.

A Member: How much Paris green could you put into 50 gallons of 450 Bordeaux before it would burn?

MR. DEAN: In making the Bordeaux, I do not use any definite amount of lime, but enough to neutralize it.

A Member: Do you know how much Paris green you could use with your Bordeaux without danger of burn?

MR. DEAN: I should regard the amount as immaterial, because it takes such a small amount to kill the bugs that I would not care to put in much.

A Member: I have used two pounds of Paris green and not killed the bugs and have used a half a pound and killed them.

MR. DEAN: It was not so much a question of Paris green as of bugs. If they have just hatched out they are easily killed, but if they get a little larger growth they will fairly thrive on Paris green. I have seen people put on three pounds and it didn't kill them.

A Member: Often Paris green is not ground fine enough, so that the particles will get into the mouth of the bug.

MR. DEAN: Well, perhaps I have got a different kind of Paris green, but I never had any trouble at all with the finest.

A Member: I think your success is due to the fact that you spray so frequently and get the bugs before they get any size.

MR. DEAN: When I see the eggs on the vine, I delay the spraying a day or two in order to catch them just at the time they are out; that is a little point, remember. Now, the potato plant is subject to many diseases. We have the common scab, the ristonae, which is all over the country, black leg, fusarium wilt, and blight. Against two of those diseases we can disinfect. Against the common scab, disinfection with the formalin solution is all right. Against ristonae disinfection with corrosive sublimate is all right. Against the others we cannot disinfect.

A Member: Why do you make a difference between corrosive sublimate and formalin solution on those two diseases?

MR. DEAN: The corrosive sublimate is a deadly poison and many people dislike to use it, because they are afraid of the stock eating the tubers, so if you don't have much ristonae and wish to control scab, the formalin is very satisfactory for that purpose. Sulphur sometimes has a little value for disinfection; at other times, not much. By the way the State of Maine averages 1900 pounds of fertilizer, high grade fertilizer, to the acre. They average 260 bushels of potatoes to the acre, which is larger than the crops of Germany, of which we have often heard. We can do a great deal towards those large crops, although we cannot quite equal them, by using the right methods.

Gentlemen, I have tried something in the last three years which I think is well worth the attention of every potato grower, though it is hardly definite enough yet to advise fair and square. I have been trying the practice of ploughing under any fertilizer, applying the fertilizer to the top of the ground, disking it in thoroughly and then ploughing it under. My object is to draw the roots down and spread them through the soil. Often we feel that fertilizer applied to the surface over in the drill row draws the roots up so that when a time of drought comes, the roots are all at the surface and there are no roots in the ground, and what little moisture we have in the soil is certainly not in that top surface soil where the roots are, and I know that in 1913, when so much of the potato crop of New York State was ruined by drought I had the heaviest crop in that State and I attribute it entirely to the fact that I had the roots down.

A Member: Was that applied in the fall?

MR. DEAN: No, in the spring.

A Member: Then you don't plough in the spring?

MR. DEAN: Oh yes, I disk all through the whole spring, and at some time during that disking, apply the fertilizer.

A Member: Well, you plough in the fall?

MR. DEAN: Yes, sir.

A Member: Then you re-plough in the spring?

MR. DEAN: Yes.

A Member: How deep do you cover your potatoes?

MR. DEAN: They are covered eight or nine inches, above the seed, but they are not over three or four inches below the level of the flat surface of the soil and that is dragged down in a day or two afterward.

A Member: You say the tuber was only three inches under the level of the soil after you finished planting?

MR. DEAN: There is a ridge and if you level it down with your hand, you will find that the tuber is only three inches down.

A Member: I'd rather have it concave than a ridge.

MR. DEAN: That is better, yes, but there isn't any tool to do that. The quantity of seed used to the acre depends upon the price of seed. For example, seed is cheap this year and a large amount of seed to the acre is a good form of fertilizer; in dear seasons, it might be a very poor form of fertilizer.

A Member: Just a question here; about what quantity of seed to the plant—say we plant by ridges in the hill—how many ounces of seed would be the limit of the amount we could afford to plant? Have you ever figured it?

MR. DEAN: No, that would be variable with the price of seed.

A Member: I heard a man once make this announcement when he started out to talk on potatoes, that he grew an average of 400 bushels to the acre and cultivated 80 acres. Some one asked him how much seed he used. He said twelve bushels or fifteen at the extreme, and then he went on to say that he liked to have a potato near a crown and cut it in four pieces, and when you figure it out, that takes fifty-six bushels of potatoes to the acre.

MR. DEAN: It is quite possible we could use a larger amount than we now use, very profitably. Here is a little point for the potato grower; they have in Colorado a tool called a cutting box, a hopper on legs with a throat in the front and you sit in front of it with a fixed knife and pull the potatoes against that knife and you can cut twice as fast as with a hand knife. You have perfect control over the eyes you get on each piece and you can always get your seed divided on your best eye so as to have just as many to the hill as possible. You can get it in Colorado Bulletin, 176.

A Member: Would you plant the small potatoes as much as the large ones?

MR. DEAN: It is practically safe to plant them if you have them, but I don't have them.

A Member: You would not select that hill if it had small ones?

MR. DEAN: Out of 500 bushels that I hand-picked last fall, I probably didn't have a peck of small potatoes in the lot.

A Member: I would like to know if the natural type of that potato is oblong? I mean the Uncle Sam variety.

MR. DEAN: That variety runs in a whole lot of different types, there is a lot of variation and yet it is identical because the sprouts, the seed blow and the top are all the same.

A Member: You cannot tell another man how to pick out the best hill, can you? He can usually do it himself?

MR. DEAN: He can do it himself.

A Member: In selecting hills, you would take a hill with four or five medium-sized potatoes in preference to one having more small ones or those very large ones?

MR. DEAN: I usually select from six to eight.

A Member: Can you tell me why this last season the set was small on all sorts of potatoes?

MR. DEAN: I would like to know myself.

A Member: Isn't it because it was dry?

MR. DEAN: I don't know. I wish I knew what the trouble was.

A Member: Do you think you can control fusarium by taking out the diseased tubers?

MR. DEAN: You can do very much toward controlling it.

A Member: You can't get it out of the soil?

MR. DEAN: Oh no, the trouble with fusarium is that it is such a bad disease that the most important thing to do is to keep it out, and this method of going through the part of the field you are going to use for seeding next year and getting it out in September, is one of the surest ways there is. You can cut your seed in the spring, but why not cut the dog's tail off behind his ears? Get them out in September when you have got six or seven or eight in the hill, and be done with them, and you won't have to look over that ground every time.

A Member: Do you think there is any danger of carrying the disease?

MR. DEAN: Personally I don't know. I keep a pail with a strong solution and if the knife goes through a potato in any way diseased, I put the knife in the pail.

A Member: How is the Rosette, that the New York people talk about?

MR. DEAN: It is advocated quite a lot, but men I have seen that raise it don't think it is quite as good, but it will probably be worth trying. Eastern city markets will pay the highest price for a medium-sized potato. Eastern city markets discriminate more against a potato because it is large than for almost any other reason. They also want it to be flat or round or flat and round, short or oblong and of good cooking quality. That is where you fellows down in southeastern Pennsylvania generally get a pretty high price for your potatoes, because they cook well.

A Member: By the careful selection of the earliest hills, it is possible to shorten the season of maturity?

MR. DEAN: It certainly is possible.

A Member: I believe I have done it, but I am not positive. It is either a change in the climatic conditions of the location or a change due to careful selection, but we get them ten days earlier than I first got them.

MR. DEAN: Out at Alfred College I ran across an old gentleman who shortened his earliest hills of Early Rose for a good many years, and in selecting hills of Irish Cobbler or Early Rose it would be essential to select hills of high yield.

A Member: You speak of digging seed potatoes before they are thoroughly matured; in what condition would you want the vines?

MR. DEAN: Well, the vines would be dead, the succulence practically out of all the stems; the skins would sweat a little, yet you couldn't do that in a season when the blight was on, in a subsequent season; it would be necessary to wait awhile and dig on one of the wet days we often get to dig in.

A Member: At what time do you plant?

MR. DEAN: Under normal conditions, about June first.

A Member: For the late crop?

MR. DEAN: Yes sir.

A Member: What do you know about Paris green injuring the vitality of the potato?

MR. DEAN: I don't know anything about it.

A Member: Why don't you recommend that as a bug poison?

MR. DEAN: I am rather confident, however, that the average use of less than a pint of Paris green to the acre year after year, counteracted by the use of lime won't injure it very much.

A Member: How many bushels of seed do you plant?

MR. DEAN: In seasons when seed is cheap and abundant, fifteen or seventeen; when it is dear, I get down to ten or twelve. I firmly believe that a man with a good market near a large city can often profitably use a larger amount of seed. In Europe the average amount is twenty-seven bushels, but I haven't got the nerve to recommend that. There isn't any one subject in seed potato experimentation that has been more thoroughly tested than the amount of seed potatoes to the acre, and it is shown that the insistent use of large amounts until you get up to forty-five bushels per acre—using my variety and with the condition of soil I have, I began in 1905 planting twenty-four inches apart and got down to fifteen, seventeen, thirteen and am now down to twelve. I am aiming to produce the right size of tubers for my market. If you had the Green Mountain type, you'd want to plant further apart.

A Member: What about Carmen No. 3?

MR. DEAN: Just about the same thing.

A Member: You would plant a foot apart in the row?

MR. DEAN: I would. I don't know whether my neighbor a mile up the road who has got a market garden, would plant closer or not; it depends on the richness of the soil.

A Member: The richer the soil, the closer they will stand together.

A Member: Is that the only thing against a cover crop, the tendency to allow it to stand too long in the spring?

MR. DEAN: Of course there is the cost of the seed, the labor and of the humus destroyed.

A Member: I always put on a cover crop.

MR. DEAN: Frankly, if I lived in southern Pennsylvania I would use a cover crop. I live in New York and don't use it; it is just a matter of climatic conditions.

A member: Do you use commercial fertilizer?

MR. DEAN: One ton to the acre; this year I cut it down to fifteen hundred pounds because I got potash; I used the same amount of fertilizer this year of potash that I did last year on most of the land, but I did not want to increase the amount because I was afraid that the use of so much phosphate would shorten the life of the crop. You know yourself that the phosphate shortens the duration of a crop.

A Member: How much do you use in the row?

MR. DEAN: It is all put on the top of the ground and ploughed under. That is something which is new, and Mr. Martin will bear me out and perhaps it would not be advisable to go out and say that I advised it; for a short amount of use, I found it a good thing; but if you are going to use less than three or four hundred pounds to the acre, applying in the rows is all right; when you get up half a ton, I would much prefer to have it broadcast to draw the roots out all through the soil, and personally I believe that putting fertilizer under deep is very valuable because it draws the roots down; certainly in August when we had that extreme hot drought that we almost always get, we don't want the roots up in the top of the soil where there is not any water. If we have them down, they will take advantage of any water there and stand.

A Member: Did you say how you would cut the potatoes to use for seed?

MR. DEAN: Exactly the same as the rest of the seed. The eyes on the extreme end of the tuber give a larger yield than those on the rest of the tuber, and so it is advisable, so far as you can, in cutting seed, to get as many seed having those end eyes as possible. Of course with a machine planter you have to have pieces of about the same shape and I very often cut small-sized tubers into three pieces having one piece across the butt end of a little larger size than either of the others because it hasn't got the eye, so I give it a little more material to work with, and then have two pieces with seed end eyes on, and very often six pieces, the seed ends quartered lengthwise and the butt end, half.

A Member: Would the same effect be produced if that potato was cut before there was any start of reproduction in the end containing the terminal bud?

MR. DEAN: Same thing.

A Member: I think the stem end would be weaker because the other has started in advance and exhausted the vitality of the stem end. I have made experiments for five years by taking two sections of the potato and the climatic conditions of that season controlled it entirely; those nearest to the terminal would come earlier and then a dry spell set in and these came and the stem end would have the advantage of that and vice versa. I conducted that experiment five years and it proved to me that there was nothing in the different ends of the potato if given the same chance.

MR. DEAN: At Cornell for five years the seed end eyes have always given the largest yield, with the exception of last year. Last year they sprouted something terribly, their seed end eyes sprouted first, sprouted their life all out, and then the butt end eyes yielded the most, they had not sprouted as much yet.

A Member: What do you do with the potatoes to keep the sprouts back, when you plant them in June?

MR. DEAN: Use some ice in the cellar, for one thing, and keep the cellar just as cool as possible early in the fall. Now there is a point—the potato plant has a certain period of dormancy and if we keep our cellar cool early in the fall as they are dug, if possible, we will prevent them from getting over that period of dormancy; then keep the cellar cool all winter and just as cool in the spring as possible, always open the doors at night and shut them in the day, and then by using a little ice in the cellar I find I can keep my sprouts fairly well.

A Member: But you wouldn't find the ordinary farmer in position to do that.

MR. DEAN: I am an ordinary farmer.

A Member: But when you are raising ten acres of potatoes, that is not ordinary.

MR. DEAN: One member suggests that you bury your seed. I have never done that, but I know it is advocated very much and done very much in Ohio, where the conditions are similar to yours, but I have never done it. Cold storage, if the storage is well done, has no detrimental effect on a seed. The trouble is that you are trusting your potatoes to somebody else who doesn't know very much about potatoes, and it is likely that something will happen to your potatoes that happened to a friend of mine last spring when they ran so far down that he got about two-thirds of a stand. If you are running a storage plant yourself, you can watch it, but that man does not appreciate how essential it is that the temperature should not go below 32.

A Member: At how low a temperature would you keep them if you had a plant of your own?

MR. DEAN: As close to freezing as I could. I am planting with a planter that will handle large pieces this year. The Iron Age has got out a planter that will handle large pieces and I have got it. I will put the amount of seed this year up to about twenty bushels.

A Member: Which do you prefer, stubble ground or clover soil?

MR. DEAN: I prefer to think of potatoes as part of a rotation in which the idea of trying to get humus is an essential thing, so that the potatoes should follow some grain crop if possible. On dairy farms, men often have them follow corn which has been heavily manured, but whatever the method of growing potatoes, humus is something that is very important. We all realize how potatoes wear on ground very hard.

The CHAIRMAN: Now, ladies and gentlemen, this brings us to the close of the program for this session and we will proceed into the Ladies Session and the first subject is "Efficiency in Home Making," and I have the pleasure of introducing to you Dr. Hannah McK. Lyons, of Lincoln University, Pa.

Dr. Lyons presented the following address:

EFFICIENCY IN HOME-MAKING

By DR. HANNAH McK. LYONS, *Lincoln University, Pa.*

Mr. Chairman, and Members of the Institute: There is a saying "that the perfection of art is in the concealment of art," and I think sometimes if this is true anywhere, it is true in our homes, where our efficient worker is able to keep the little details, the little bringings together that makes the home perfect, out of sight, as it were. You say, "But we don't want to conceal art." Neither do we, but after all I think if I bring you an illustration just out of the many meetings that we attend in a year, you will catch my idea. For example, one comes to preside at a meeting and manage it through and a large part of the time perhaps you are just grated on the least little bit. They are always making excuses for the person that is not there and what they intended to do and meant to do and tried to do. Again, you go into a meeting and your presiding officer somehow never makes excuses; at the same time they have just as trying things to manage; but it is always the thing we are going to do and that we get done that they present to you. And so in home making; if we may keep out of sight the little things that we meant to do and have not quite accomplished and always bring forward to view the things that we are accomplishing and that we are doing, it seems to me that that is real art and yet it is the concealment of art, as it were.

Within the last few years many new words have been coined and brought to us; at least, if they are not entirely new words, they come to us with a new force and new meaning. I think you will recall not so many years ago when we all began to use that word "strenuous;" it was the *strenuous* life we were leading, or someone was leading. Again, I think you recall when we began to use that word "conservatism" so much, when we were conserving the public interests, that is the great natural resources of our State. Again it is the word "efficiency" perhaps that we are learning to use with a new meaning, and so I believe that that word "efficiency" belongs to the home just as truly as it belongs anywhere. Somehow we women in the home feel—well I think we have been taught to feel that and we did it and we do feel it perhaps yet, that somehow the home did not amount to just as much as the farm; that somehow the home was not just the real thing and the whole thing perhaps. But you know things have changed and to-day you and I know that the home is just as important as the farm and that the home-maker ought to be trained as well as the farmer is trained; that the home-maker must know her work and her duty there if the farm be all that it ought to be.

Not very many years ago I think you recall the papers coming out with the story that where a certain piece of work had been done with perhaps six motions, that that firm was now able to produce the same thing, just as good in quality, with four motions, and so that news was heralded all over the world, and it was a wonderful thing that now, with just the four motions, as it were, this piece of workmanship was being turned out. I wonder if any of us have ever tried in the home just how many motions it took to do anything, and then

whether, after realizing that we have used up a good many motions, we have tried doing the same thing right over again and using just half that many motions or a less number? And then, friends, if you have succeeded in doing it with a less number of motions, may we not herald to the world that a woman's work, a certain part of it, may be done with less motions; and if it is done with less motions, may not every woman know it, that the fatigue and wear that comes from this constant keeping on and on and on through the many hours of the day may be relieved and that she may find time for enjoyment, for reading or for something else? Have you ever watched two women at work, how one goes about and there seems to be continually that lost motion—not lost motion exactly, but too many motions? Lost motion I mean because she uses so many motions to accomplish a thing, and yet here comes our efficient woman doing the same thing and every movement she makes counts. Perhaps it is only clearing away the dinner table, but she never allows her kitchen table to get in such a clutter that she has to move this and that and the other and then move it back again and then change it on to her tray to go to the cellar, and perhaps the one article has been moved three or four times to get things in order before her tray is ready to go to the cellar or the storeroom or refrigerator or wherever you put it in its place.

See that the kitchen table is kept so that the thing here goes exactly to its place while we find it with our small people who are helping us and that we are training to be efficient workers, or the first thing you know the table is all in a clutter and you have to make half a dozen motions perhaps before you can bring order out. And see the extra work you are making, the extra fatigue there is because you are not efficient. Again perhaps it is housecleaning time and we have come into that time of year that we dread so much, but our efficient worker does not have her house torn up from garret to cellar, but she goes from one room to another at a time and perhaps the first thing she has attended to is her storeroom. The storeroom is in apple pie order and just ready for everything. When she cleans the room here on the second floor, the bedding is ready to be packed and it is pretty slow work this year, isn't it friends, because the weather has been so cold that we could not clean house really and do it right, but nevertheless our store room is ready and when the time comes for the winter clothing to go away, the store room and boxes are ready; and immediately, when they are ready they may be put yonder where they belong, the blankets may immediately go yonder where they belong; there isn't that lost motion of airing things and getting them ready to be put away and then piling them here in this room and you have got to do something there and they must be piled yonder and covered up from the dust. There is a continual lost motion there that is not counting for anything, and so I believe our worker who believes in efficiency is not doing that sort and I care not whether it is in the home or on the farm, it is all the same after all.

Again I think sometimes that one of the reasons we women have not thought so much about this matter of efficiency is because there has been no money value in our time. It has been simply a question of just crowding into each day all the duties we could get there. It has not been the thought of doing this and this to-day and to-mor-

row we turned around and had certain duties that might be done that day, but we just crowded each day as full as we possibly could; we had no thought of how tired we would be, the fatigue that would come by that crowding and crowding and crowding and fatigue never spelled efficiency, I care not whether it is in the home or on the farm, if you are fatigued you are not going to be fit for the duties to-morrow, if you have crowded to-day so full that your muscles are worn threadbare, as it were.

Just last week when we were getting ready to come away and things seemed to be crowded so full, I happened to go into Oxford, the village nearest to us, and in meeting a friend there, she said, "Now, you are in a hurry?" And I said, "Yes, rather hurried." And then she stopped and said, "But Mrs. P., my friend, says it is not right to be hurried so. If you hurry so and get very tired, you are not fit for work to-morrow and you cannot do your best work." I said, "No, I know that is true, but what are you going to do to get through when this and this and this has got to be done within 24 hours?" She says, "It is not right;" and so it is time we women learned that we had a money value, as it were, put on our time, and when a money value is put on our time—and, friends, it is worth money—but when a money value is put on our time, then will we women consider the things that we do and the things we don't do. For example, we will not spend time darning a pair of hose that you can buy two pairs for a quarter and will not last half or a quarter the length of time that a guaranteed pair will last and perhaps only cost half as much more. For example, when we think of our time being worth money, we will not spend two and three hours a week kneading the bread as it were, but for \$2.50 we will have a bread kneader that will knead the bread just as well and with one half the energy spent in it. Again, we will not spend hours, as our mothers did, with the chopping bowl and knife, chopping, chopping, chopping, you know to get that cabbage or pickle or whatever we are making just in the right condition, but we will use the little food chopper that perhaps you can buy for half a dollar, or a very good one for \$2.00 or less money even, and you will do the same work in much less than half the time, because we housewives have learned that the little chopper is one of the most economical things we can have, especially in the saving of time, and so I say we will consider the things that we do and the things we won't do when we learn that our time is really worth money.

Again, we will take care of the small things as we go through life, so as to watch the time that is being spent in doing things. For example I watched in a home not so very long ago when dinner was being served and I happened to be wandering around and not a cooking utensil was filled with water when the meal was over and the dish-washing was not an easy task. I think sometimes when I talk these things to the gentlemen they think it is pretty tiresome, but after all, men, if you washed the dishes you would know just what it meant if the dishes were put to soak immediately when the dinner was being served rather than left standing to be taken care of after the dinner is over. It is the little things after all, that make the great sum of the day, that make the big things when the day is over. It is the little things that spell fatigue or spell efficiency when the day is ended, as it were. In the home the guest was preparing onions, she happen-

to be visiting there and was preparing onions for the meal and the little daughter who was being trained for mother's efficient helper was wandering around watching the guest very closely, just as the little people do, you know, and not seeing her make the motions that she was trained to make—and you know how these little people are always ready to pass on things much more quickly than they are willing to do them themselves, and looking up, she said, "What is the first thing you do when you start working with onions?" And the guest, in astonishment, said, "I'm sure I don't know." And she said, "Always wash your hands and knife in cold water." She had learned her lesson but did not always practice it and so it is these little motions that count after all.

Sometimes we try to think that it is only in the great workshops that this word efficiency applies, and sometimes we think that our kitchens and our homes are not great workshops. But, friends, when I tell you that there are more than 18,000,000 people employed in homes—and I don't mean just the mere servants employed there, but I mean the home-makers and managers—that there are more than 18,000,000 in this country of ours, then I believe our homes are a great workshop where we need to study efficiency in method, where we need to put more study on the subject than we have been putting on it.

And again, when I tell you that more than ten billion dollars is spent in food annually, isn't it time that we studied these questions of efficiency for the home? How much of it do they tell us is wasted annually? And is it any wonder, if you will just think for a moment of all the home-makers, of all the managers of homes of this 18,000,000 how many have been trained for their positions? If you will think for a minute how many you know that have been really trained for the position into which they have come, I don't believe you will count very many. So, friends, is it any wonder that mistakes are made in this business of home-making? Is it any wonder that there are little leaks, yes, big leaks and is it any wonder that wrecked homes are the result, sometimes? Very frequently in the great workshops they employ an expert to come there and that expert will stay for days in the workshop looking around and studying their methods of business and ferreting out where the little leaks are that these leaks may be remedied, that they may produce with less cost just as good an article. It seems to me that with the little opportunities that the women of this country have had to be trained as home makers, the little chance they have had to be trained in real methods of work and efficiency, wouldn't it be nice if we could have experts come into our home and show us where the leaks are? And when I say leak, I do not mean always where you are spending your money unwisely or where you are just using your food not wisely perhaps, but I mean where this lost motion is, where you are doing a thing over and over as it were and just one effort would do the work, and then it seems to me there would be hours left for the training of the children that so frequently we hear mothers say, "I don't neglect a thing in my home, but I haven't time to train my children." Well you know I believe that the home making, that is the dusting and sweeping and some of that work, had better be left undone than the children's training left undone. It seems to me that had better come first, but nevertheless I believe that if we only knew the methods a little better, if we only knew some of the things, the how of it a little better, that we would have plenty of time to do both.

Unfortunately we women are not mechanical, as a rule. You will find it occasionally that we are, but as a rule we are not mechanical, and it seems to me that there the brothers can come into the home making with such splendid results. May I give you a homely illustration just there: A wife became sick; she was the chicken raiser of the home; and as the small potatoes and kitchen refuse was kept for the chickens and heated you know, cooked up as they do sometimes and meal mixed, she just mixed it in the vessel in which it was put. Well, we women know how the meal will get spilled around the floor and won't mix very well and how long it takes to do it; but when she became sick her husband had to feed the chickens during that time and there was a splendid little trough built in the corner of the entry near the feed box, and some remark was made about it and he said, "I never bothered with that pot a day." It was all right, she had bothered with it for weeks and he had never seen it, but when he had the chickens to feed and the food to mix, he saw it. So, men, suppose you see a little bit before the wife gets sick and do these little things that count so much for efficiency and will mean so much for time and help to her after awhile. Many times a great deal of the lost motion in efficiency is in the arrangement of our homes, especially our kitchens, where we spend so many hours of the day, and here with our kitchen table as it were in the center of the floor or near the stove, where it ought to be or must be, might be grouped or ought to be grouped the stove and cupboard and the things we must go to back and forth, so that there will be just as few steps as possible to be taken in that home.

Many times efficiency may mean simply planning. It is not that you must know so much of great things, but simply that you will plan and be willing to plan. When we get up in the morning and start out for the day's work, if we don't have a picture of that day's work, a mental picture as it were, we will not accomplish in the same time nearly so much, but if you sit down with pencil and paper and write out the next thing you would do and the next thing and the next thing, you will find that at the end of the day you have done quite as much as you would otherwise have done. Somebody will say, "But I have no time to take pencil and paper and write out what I have to do;" but you have saved more time than you have taken in writing it out and planning it out, by the mere fact of sitting down and writing out and planning out, and this is especially true where there are children to train and child helpers. If you will jot down with pencil and paper the next thing and the next thing and the next thing that is to be done during the day, the children somehow will take it up and will not forget and will be much more efficient helpers than if they try to remember and try to just go along and go along as it were picking up here and there and not knowing whether there is anything to be done next until they have been called and been reminded that they have been very remiss.

And so we might go on with this word efficiency and find all the way through the day's work and the year's work that it fits in everywhere. But that we women need to know more of the methods of efficiency, and that bring efficiency. Several times during this last winter in my work, if I may come to a personal remark or two

that has been made to me, someone will say, "You always talk for the women; don't you believe the men belong anywhere in this plan of homemaking?" I certainly do believe the men belong in this plan of home-making and I fully believe that no home is complete without the man element and the man nature in it, just as you men know a home is not complete without the women in it; in fact you have no home, no real home, without a woman in it. So do I believe that no home is complete without the man in it, and we only have to remember the homes where the men have gone out and the sorrow and the loneliness and loss that is there, to know the one is not complete, that no home is complete without both natures in it. You know the little couplet that says, "As unto the bow the cord is, so unto man is woman; and though she bends him, she obeys him; though she draws him, yet she follows; useless one without the other." And what is true in the home, friends, I believe is true everywhere. Men and women were meant to live together and work together and we cannot separate them. It is not a question of efficiency here for the woman and efficiency there for the man, but both working together that brings out the true efficiency in the home, the true efficiency everywhere there is work to be done in this world of ours.

I was interested not very long ago in an article about efficiency in the business world, where a business journal was advising the business world what would bring efficiency to business everywhere, and it seems to me that the very thing that will bring efficiency in the business world, will bring efficiency in the home world, and so may I give you the thought that you cannot get the most out of your business unless you are able to get the most out of yourself. You must feel right; you must be on your tip-toes all the time; and yet I know that many will say, "I couldn't work on my tiptoes all the time." It may be too much to expect that a man shall be right at his highest efficiency all the time; but that is the mark at which you should aim; in other words, if you cannot be on your tip-toes all the time, keep yourself there as much of the time as possible; keep yourself there not by working on your nerve, but by keeping physically fit so that you can develop high efficiency without speeding up the engine too fast. In automobile language, we are told that you can keep on high speed as easily and as economically as on low if you use the right grade of gasoline; and the right grade of gasoline in this case of efficiency for us friends is simply a combination of natural diet, pure air, recreation and the glad hand for whatever life brings to you; and I believe there is so much in that question of the glad hand, the facing of the things we have to meet and facing them believing that it is all right and that you and I can face them and that we will put them through in a manner that is wise and well, because efficiency is the word that means the things that are to be in the home and the training that we women ought to have.

DIRECTOR MARTIN: Mr. Chairman, I notice a gentleman who has charge of our splendid agricultural paper, here; I refer to Mr. Anderson. Is Mr. Anderson in the room? We would be very pleased to hear a word from Mr. Anderson at this time.

The CHAIRMAN: We would be glad to have Mr. Anderson come forward. I have the pleasure of introducing Mr. Anderson.

MR. ANDERSON: I am sure it is a very great pleasure to be with you. I have met nearly everyone here, I think, and have bored a good many of you with private conversation, and it does not seem right that I should bore you any more just at this time. I want to congratulate the Superintendent of Institutes on the splendid program which he has arranged for this meeting. I think it is one of the best balanced that I have known for a meeting of this character. I thought so when the announcement came out and I am more certain of it after having enjoyed the portion of the program which has already been given.

I want to say relative to the last talk that was given that it is a very important part, it seems to me, of Farmers' Institute work, it is a very important part of agricultural development work, that some attention, some time, some opportunity be given for the discussion of the phases of agricultural work pertaining particularly to the farm home. I have been impressed with this one thing—we have heard in recent years a great deal about keeping the boys and the girls on the farm. A great deal of our educational work, agricultural educational work, particularly in recent years, has been aimed toward the keeping of our young people on the farm, but more particularly the keeping of the boys on the farm. It has been my observation, however, that in the young couples, in the young homes that are established, that more often the likes and dislikes of the wife have more to do with the development of that home and the location of that home, than the likes and dislikes of the man. Now it seems to me that it is a very important thing that in our educational scheme, agricultural educational scheme, more attention be given to developing the likes of the girls for the country and for farm life. If the girls stay there, the boys are going to stay there and it is very important that we look after them.

I want to congratulate the members of this body, the institute men upon the very excellent institute season which has just closed. It seems to me that we hear more favorable remarks of our institute work in this State each year and I am sure that this past year has been a very great success and I hope that it may continue. It seems to me that there is only one thing that is needed and that is a little enlargement in the scope of the subjects that are discussed. We are all accused, agricultural newspapers probably more than any of the rest, of specializing too much on the question of production without giving attention to the other phases which tend toward yielding a large net profit on the farm. We have all got to come to branching out from these old subjects and taking up more the question of marketing, the question of decreasing the cost of production, in Farmers' Institutes just as much as the agricultural papers, and I hope that in future work, we can have more attention given to that. We cannot forget, however, that we have got to keep on repeating what has been said time and again on the question of production. There is always need for it.

Now I am a good deal like the fellow that was walking along the banks of a stream and happened to look down just in time to see a fisherman falling off a small pier into the stream of water.

The fellow rushed down and pulled the fisherman out and asked him how did he come to fall in. He said, "I didn't come to fall in; I came to fish." Now I didn't come here to talk, but I thank you for the opportunity and for your attention. (Applause).

DIRECTOR MARTIN: Mr. Chairman, as you will have noticed, this session of the Institute has been somewhat miscellaneous in character. This is brought about for the reason that we intended and had planned originally for a night session here, for a closing session, having part of this program in it that we have covered this afternoon. The evening promises to be so cold and we have been under an exceedingly heavy pressure here, notwithstanding all the other pleasant surroundings that we have enjoyed so much, the many courtesies that we have enjoyed from the good people here in Crawford county and in this place; yet there is one element among the many elements that we cannot control, as we have learned, and that is the condition of the weather. We realize that and we want to express regret that we will probably be denied the exceptional privilege of enjoying those two addresses that have not yet been rendered by Miss Sara C. Lovejoy, of State College, and Mrs. Rose Morgan, of New York City. I regret for myself and for this audience that we could not have engaged in that exercise this afternoon or to-night. But there is a limit to our endurance, and with the fear that to continue this session much longer might endanger the health of a good many who are here, I want to say one thing, that I have noticed that some of these old boys that are here, have stood up under this pressure remarkably well. I guess they were born in that phase and time of the moon that gave endurance.

A Member: Going to stay there, too.

DIRECTOR MARTIN: Yes, and we appreciate at this time the attendance, the full attendance of the County Chairmen of Institutes and the lecturers. I want to say to you, my friends, since our friend, Mr. Anderson, mentioned it, the efficiency of the Institutes during the past year, whether my ideal be a low one or a high one, has appealed to me with greater force than ever before in the sixteen years of my service, not that the attendance was greater than in some other years, though it is pretty near up to the highest attendance that we have ever had, but there was a marked interest in every county of the State as to the questions and the subjects that were discussed there as to bringing about the very best methods to be employed. We have a large list of these questions, showing that the mind of the farmers of Pennsylvania is leading to the question, as our good lady has expressed it, of greater efficiency along every line. And indeed, my friends, these Institutes are organized and carried forward for the very express purpose of developing a better agriculture, a better farm practice and having higher and better development of the farm homes of Pennsylvania. To that end they are giving—and I might say that we have come to the time in the history of this part of our State organization in which not only shall we learn of greater efficiency and plan for the adoption of better methods, but the time has come when we must learn to co-operate one with the other in such a manner as not only to grow better and greater

crops, but see to it that those crops reach the better markets at the less cost. These are questions that are coming up before us, and future institutes, in my judgment, will progress along these lines; not that we shall lose sight of the one, but we will get a broader vision of the other side.

My friends, you may be interested, since it will not be possible to hold another session, you may be interested in knowing something, just in a few brief words, of the attendance last year throughout the State. I would say that the attendance at what is known as our regular scheduled Institutes was 165,280. Then we have a system, you know, of Movable Institute schools. The attendance at these schools was 11,908. We have another system working as a wheel within a wheel, of Special Institutes. By the Special Institute, we mean the institute either after or before, the regular institute season, in which the people called for additional work in various communities, and when we send one or two or more speakers to attend that meeting, organized in some home location. Now at these institutes last year, there was an attendance of 9,456. Thus we have a total attendance at our institutes proper, of 186,644. This is not a packed report; we get this report from the leader of the section of our Institute Lecturers, and additional reports from the County Chairmen of Institutes. Then they come to the office and we compare these reports. If we find any great variation, why of course, we inquire into it, so this is the actual report as verified by two sets of reporters.

In addition to this, along with this work, there were 400 days of institutes carried on last year and divided into 218 sessions. The special days for the Special Institutes were 15, with 11 sessions, and the Movable Institute schools were 29 days with 7 sessions. There is something very interesting in part of this brief report. Possibly you may be interested in knowing just what counties gave the largest attendance at Institutes. I want to say that for the past two or three years old York county has been leading the van; the regular institutes in York county last year—there were 12 days, and the attendance was 12,617. That is a pretty good attendance, there were also Special Institutes held there in which, at one time, there were 3,300, at another time 450, and one at Stewartstown, in which there were some other issues, there was an attendance of 2,327. This, added to the 12,000 attendance in that county, would make the number 15,694. The county having the next highest attendance, was Montgomery, with 5,375; Franklin, with 5,084; Tioga, with 5,015; Lancaster, with 5,996; Indiana, with 4,465; Clarion, with 3,973; Fayette, with 6,380, and in the other counties, the attendance ranged down to 2,000. Now this is only a general report. The attendance according to the population and number of farmers is not large, but I read this brief section of our report to show that the Institutes of Pennsylvania are not only increasing in number, but have become much more vital in the interest manifested on the part of the farmers, all of which is a very great satisfaction to me, and a great proportion of the credit for this great and wonderful development is due to the efficient management of the County Chairmen of Institutes of Pennsylvania who perform the vast amount of this work without money and without price. I tell you that when men are so interested in the development of agriculture as to devote

a month of their time in many of these counties to this work, the work cannot fail. We are proud in Pennsylvania of our corps of Institute Instructors. We have challenged the United States and we here throw down the challenge to produce a corps of instructors that can meet the conditions of agriculture to their equal.

Now, my friends, it is with regret, as I said before,—and possibly those two instructors may come on the evening train, and we do hope that since we will be disappointed in hearing them, that they may not be disappointed quite as much as we will be. We deem it best that we should adjourn this meeting about 4 o'clock in order that we can get to moving homeward. And again thanking you all for the manner in which you have sustained this great work in this meeting, I bid you adieu for the present. (Applause).

(NOTE.—Prof. Helmer T. Rabild, of Washington, D. C., was unable to be present at the Normal Institute to read his paper on "COMMUNITY BREEDING," as announced in program of Tuesday afternoon; however, his paper was sent to the Director of Institutes, and same is published below. Owing to the necessity of dispensing with the last session of the Institute, on account of the cold room, the evening program was carried out only in part; Mrs. Rose Morgan, of New York City having been placed on the program for the "WOMEN'S SESSION," which was dispensed with, and arriving after adjournment, her paper, "SONGS THAT LIVE," is also inserted below. A. L. M.)

COMMUNITY BREEDING

By PROF. HELMER T. RABILD, *U. S. Department of Agriculture, Washington, D. C.*

The majority of the cattle of this country represent haphazard breeding which largely accounts for inferior and unprofitable stock. In some neighborhoods an individual farmer decides to grade up his herd by the use of a purebred sire of a definite breed. Another farmer also decides to use a purebred sire, but because he does not want to appear to copy the example of his neighbor, he may buy a sire of another breed. Eventually there will be a community of rival breeders of all the dairy breeds, which is radically wrong. The remedy for haphazard breeding as well as varied breeding is a Community Breeder's Association.

The purpose of a Community Breeder's Association is two-fold:

First, to improve the native cattle by the use of purebred sires exclusively, and purebred cows so far as possible, all of the same breed.

Second, to put their business on a more substantial basis through co-operation.

The advantages of a Community Breeder's Association are as follows:

It is educational. A body of people in pursuit of the same end can profit not only by their own experiences but also in the experiences of their associates. However well informed a man may be he is continually meeting problems that puzzle him. He needs constant advice and suggestions from the brightest members of his association. He needs to exchange views with his fellow-men and to enlarge his perspective. A co-operative association can obtain the services of a speaker from the agricultural college, or prominent breeders from other associations. The experiences, not alone of one community but of many communities enable a breeder to overcome the many annoyances which he must overcome.

An association enables the breeders to co-operate in buying. A group of farmers can buy a bull in partnership and use him collectively. This is a great economy over the plan of several farmers buying their individual bulls and using them on only ten or fifteen cows. Moreover, if a large number of cows or bulls are to be bought for the community a large saving can be effected by having a representative committee of, say three men, purchase the cattle instead of each of the dairymen having to pay carfare and other travelling expenses incurred in the selection and purchase of animals by him for his own herd.

An association enables the members to co-operate in selling. Even though it be a small community it can build up a reputation not only in the country but among all nations. As an example of a small community building up a reputation for the Jersey cattle, we will cite the Jersey Island. As an example of a small community building up a reputation as a Holstein-Friesian center, we will tell about Lake Mills, Wisconsin.

In the consideration of such a subject as community breeding, it is well for us to note what has actually been done along such lines. One of the very best illustrations of community breeding is to be seen in the Island of Jersey. In the year 1789 the dairy farmers of Jersey succeeded in getting passed a law which very explicitly prohibited the importation of any cattle whatsoever for breeding purposes. After 1789 the cattle which were sent to the Island were sent for beef purposes only. They had to be slaughtered within a few days after reaching the Island of Jersey.

What has been the result of such a consistent effort in community breeding? One result has been a steady demand for these community-bred cattle. Cattle breeders from England, Denmark, Germany, France, the United States, and other countries went to Jersey Island to buy cattle because they knew that everybody on the Island was interested in the same breed of dairy cattle. Since everyone there owned cattle of the same breed, buyers were sure to get pure-bred animals. Furthermore, a dealer's chances for filling a large order for a special breed of cattle were good in a community where every dairyman kept the same breed of cows.

Other breeds of livestock owe their origin and development to community breeding. For instance, in the province of La Berche, in France, the community took an interest in the breeding of a certain type of horse. The famous Percheron, which resulted from this community breeding, is still eagerly sought for by buyers from other countries.

Every breed of improved domestic animal that we have to-day is the result of community breeding. Among cattle, we have already mentioned the Jerseys. We might also name, as examples of community breeding, the Guernsey, from the Island of Guernsey, the Ayrshire, from the county of Ayr, in Scotland, and the Holstein-Friesian, from the province of Friesland, in Holland.

A good example of the value of community breeding, is seen in the community breeding of Holsteins at Lake Mills, Wisconsin. Over \$175,000 worth of Holsteins are shipped out of this community yearly. In a single year from 40 to 50 carloads of grade Holsteins left this community for Mexico. One buyer is reported to have purchased as high as 800 head. On May 5 and 6 last, there were 125 head of Holstein sold at an average price of \$283.56. One bull, King Segis Pontiac Polkadst, consigned at his sale, sold for \$6,800. Eighteen animals sold for \$375 or above, sixteen for \$400 or above, twelve for \$425 or above, eight for \$450 or above, and five for \$500 or above.

Buyers are attracted to such a sale as the one held at Lake Mills, Wisconsin, because they feel reasonably certain of being able to buy in large quantities and also of having considerable opportunity for selection in sections where community breeding is practised. The breeders can co-operate in advertising their stock. If we look through any of the larger dairy papers we will find the advertisement from a community breeders' association. The expense of this advertisement is borne by the association. This is cheaper than a large number of small insertions. The prospective buyer writes to the secretary and the secretary in turn sends to the buyer a list of all the breeders in the association together with the descriptions and the prices of the stock each has for sale. The buyer is then enabled to purchase directly with the least inconvenience exactly the animal he wishes to obtain.

When a community becomes sufficiently interested to take up community breeding, it will very naturally use co-operation along other lines. It will be very apt to develop co-operative feed buying. It will also co-operate in the eradication of tuberculosis, contagious abortion and other contagious and infectious diseases. The spread of such diseases would be very materially checked if, in a community, every farmer took an active interest and co-operated with his fellow-breeders in having his cattle systematically inspected. They would also tend to adopt better methods of sanitation and their efforts along these lines would result in a community owning herds that were almost disease-free.

In general, it may be said that community breeding advertises the community, attracts to it a class of large buyers, and, in addition, tends to bring about other less important, but very considerable advantages of co-operation such as co-operative feed buying and a co-operation in fighting disease.

SONGS THAT LIVE

By MRS. ROSE MORGAN, *New York City.*

The child who, grown old, finds himself in possession of the blest traditions and memories of the places and things of his childhood, enjoys a legacy whose worth increases with the years, whose meaning unfolds with life. Probably there is no form of early home influence more enduring than the home song; and its power is continuous in proportion to the place it occupied in that early home influence. The home song, therefore, should be fundamentally a thing of truth. It should not be the woven tinsel of fancy and sentimentality, but it should be composed of words and melody that are coined from the heart's pure gold. Such a song lives. There are few homes in this State where a good song, if once it became installed, would not be appreciated, and there is no home that would willfully cancel or lose the power of that song as a memory-maker and as a character-builder. Unworthy songs have crept in not because our home-making hearts are wrong but because our home-making heads and hands are so full of the work of the insistent present and the foreshadowing future that we do not often stop to weigh the values in songs as in other things.

We believe the song to be a character-making force. We believe that there are better songs for the country school, the grange, and the occasional country-life program than are ordinarily used in them. We believe that there are better hymns for the country church and Sunday school services. We believe, and it is this phase of the question we wish to deal with especially, that the home is the natural center of that power for good which we rest in song, and that there are better songs for it than the average home of to-day provides.

Already work has begun to meet the problem, which our weighing of the values has revealed to us, touching song in the home. The conclusion that the country home should, and can, and will, make a radical change in the character of its songs is being reached by the consent and co-operation of fathers, mothers, teachers, preachers, and others who are vitally interested. These men and women are working to the end that the country home shall be clean of the "praise that cannot purify," of the passing life wherein life's sacred relations are made a joke, of the song that cannot possibly bring a sweet home-memory in the after years to the children who have gone out from the home.

It is true that most of the cheap and vicious songs originate in cities, but all too quickly they find their way into rural communities and homes. During the last two years many persons have gone over the matter together, have given testimony, and have compared conditions and experiences. From data that have been collected it has been found that for some reason it is true that to-day the young people in the country homes are almost or quite as much exposed to the blight and contamination of trashy and filthy songs as if their homes were not aloof from and independent of the sources and sites of such songs. The reason for this has been searched for and has been found.

The fear of not being "up-to-date" in the matter of songs, and the eagerness to have country homes and boys and girls enjoy what purports to be created for the giving of pleasure as exploited in the city, has set country people to hasty and indiscriminate buying of "the latest" music. The unworthy type of city music has been adopted, and it has been called representative; the vast amount of worthy music that is heard at its perfection in the city has been temporarily forgotten. Think of the church music, the operas, symphonies, and oratorios, the concerts and recitals of high grade! Many of these musical entertainments are free to the public and are even organized to be carried free to every part of the city. Think of the great choral societies, the carefully taught music in high schools and graded schools, the chances for the best of training in every phase of music—all of which tends to shorten the life and the influence of the bad song in the city, even though its spread is universal.

Better songs in the country home is quietly becoming one of the working texts in many communities of this State. There is not only the desire on the part of people in rural communities to choose between the good and the bad in songs, but there is the ability when thought and care are given to the judging.

When the trashy song secures a place in the country community, what is there with which to meet and annul its power for lowering the tone of life and the "blessedness of the country"? Perhaps there is a pastor and choir with appreciation of the value of good songs, perhaps there is a high grade music teacher or school teacher. It may be that the community has a patron saint who invests thought and time and patience and money to the end that good music shall meet and conquer the invading bad. The most effective influence for good in songs is the influence that emanates from the home, for it is lasting. The solution of the problem, however, rests largely with the individuals that make up each household. They may show their devotion to the high ideals of the country by refusing to buy, sing, or tolerate besmirching songs of the hour.

Suggestion is the birth of thought;
Thought dwelt upon becomes action;
Action repeated becomes habit;
Habit is character.

Because of the comparative isolation of the country home many desirable features of good home-making must come to it slowly. Its very isolation and independence make it the natural friend and advocate of the good song. Its open windows do not let in, perforce, the contaminating street song. Its doors can remain closed to the rap of a blighting "best seller" until the family within have taken time to pass upon the merits of that song, to discover whether or not it is in harmony with the family's aspirations to secure good things for itself, and whether it voices the family's spirit of independence in the obtaining of these things. Heretofore, the people of rural communities have hardly considered their responsibility in the setting of standards for good home and community songs. Now that the whole American people are working—slowly, it is true!—to the question of good and bad songs for their homes, is it not reasonable that the country people should assume a strong leadership in the matter? Should they not be the ones to say what shall and what shall not constitute their home and community songs?

The meaning of a song is conveyed by the combined force of its words and its melody. In a song the melody seems to give rise to the words and the words to the melody. Men naturally sing of what fills their heads and their hearts. The resulting song is good to the degree in which it suggests the good and the beautiful through its words or melody, or through both. A song is to be neither approved nor condemned because it is new. Nor should it be counted without merit if in actual use it seems to touch the hearts of young and old as it finds its way out into the world. But time and opportunity are as precious as they are fleeting; and what family is there that can afford to rest its family traditions and future memories on songs of uncertain quality when good ones can be had?

Since I have known that we were to have this evening together on "Songs That Live" the local song traditions of Pennsylvania have become of interest to me. And as truly as Pennsylvania has its distinctive people, features and characteristics, as truly are these distinctions written in the historical and traditional songs.

May I say to you at this time that I have made, during the last month, a list of songs which, by content or adaptation, or both, are peculiarly expressive of Pennsylvania and its country life, including some that are not only sentimentally and traditionally, but historically true of the local life of the State. It would give me pleasure to forward to you this list upon your request. Columbia University, New York City, through its department of agriculture forward to me mail addressed to me, Department of Agriculture, Columbia University.

But to-night let us prove to each other how, though local traditions give rise to interesting and long-lived songs, the songs that live and will live are those which we can all share in common because of their appeal to us all. We shall not apologize that the personal must enter in. My home is not one of the type you yourselves know. Its songs are your songs, also because "home songs" are a common heritage and because there is no life so well forward that it has no need of a heritage of home songs we spend the remainder of our evening together talking of and singing songs that live in our hearts as though we were all one large family, looking backward together, looking forward together.

Back in Wisconsin is an old home where six grown children go as often as they can. It has been my habit, as one of the six children, to go at Christmas time, and before the two weeks vacation is over, invariably I find the little chest by the piano side, and that chest is indeed a center round which the family gather. Father and mother were pioneers and they could not carry with them mahogany treasures and the silver and linens from back East. They took just the least possible as pioneers. And yet the children have a heritage, and I would not have it other than it is. The family treasure is the contents of that little chest. Very meager would that little treasure-chest be in some people's eyes; to mine it is invaluable. It contains the old home songs.

I want to say to-night that if you have the same kind of riches, then you have in your mind a great number of songs that are increasingly dear to you. They are the songs of your boyhood and your girlhood, and particularly the songs that you learned in and about your own old home. Now I would not say: "Don't sing this,

and that," and suggest nothing of substitution. As workers and leaders you do not need to be taught, but perhaps you do need to be called to sharp account for a thing you know so well and perhaps do not do. So let us gather up some songs, some old songs, types of the world's "songs that live." If you will, we shall go together across to the countries that are older, and get some of their songs for yard-sticks, and then we will hold our own songs by them and see how they will measure up.

Let us go direct to the places where much of our blood comes from, represented here to-night. I have had a great deal of interest in looking up how many Scotch and Irish there are between New York and the Mississippi, and the percentage runs high. Twenty-two per cent. of the families are to a considerable degree Scotch-Irish; some are Scotch and some are Irish, and so we will go to the countries where Scotch-Irish blood comes from, and we will get some of their songs as legitimate song standards for our own country. The first thing I heard, crossing on the boat that took me north was a song that reminded me that the Irish people are a home-seeking, home-loving people. Oh, they are jolly on this side, and they are known as jokers and the men and women sometimes do the heavy work, and sometimes they do the politics (and perhaps that is heavy), and then sometimes they do the kind of thing that brings us up sharply: they do the thing that is so genuine that our hearts run right out, and that is the Irish song. The Irish song that I have in mind was sung by a boatload of Irish folks going home, going back to Ireland. I had first heard the old song years ago; everybody in the steerage knew it and they all joined in. I will sing a stanza of it, and you will all recognize it as a good, clean Irish song. Yesterday I heard the grind organ playing. I looked at the man and he was an Italian; I spoke to the man on the corner, who was listening, and he was a German, but they all knew that tune; it was "Kathleen." What does it mean? It is a home song, and a heart song, and it was written more than a hundred years ago, and while a simple ballad, it is a right kind of a song. Although an Irish-born song it has lived and will live because all nations love and sing it.

I had been on the boat seven days. I was with the others in the dining room the last night,—that is the night of the captain's dinner, and on that night we are all asked to sing our country's songs, and there, *that night*, I learned a lesson I like always to tell because it was distinctly a lesson to me. You know the substance of it already; but let me remind you. It was this way. The Germans were asked to sing, and oh, how they rolled out their song. The French sang their song, and it was as beautiful as silver trumpets, and everybody of the French folk knew it. It came time for the English and they all sang: "God save the King." Then came our turn, and we were the major part of the passengers. We all began to sing "America." We finished the first stanza, and tried the second, but some began the second and some began the fourth, and some began the third, and we giggled and looked at each other, and then we quit. I had training in singing and was going across the sea with my passport to protect me as an American citizen, but I could not sing America's National Hymn. I walked the deck afterwards with an Englishman, and this Englishman said to me something about the song which we

did not sing, and I apologized or tried to: I said: "We don't sing it as frequently as you do." (You know they close their theaters and the like with "God save the King"), "And you know, we are a new country." He replied: "Yes, indeed, very very new, indeed." And I never since have apologized to an Englishman for not knowing America, every word and every stanza. I learned it, and on the return voyage we did not break down singing America.

But we are still on the boat, where an old priest has said to me: "So you are after songs,—then you must come to our country and come to our part of the country; it is the bonniest place in all Ireland." The song and the place was "Killarney." The man who drove me could drive, smoke, and sing at the same time, and I learned from him the genuineness of the Irish heart in singing folk songs. I learned that all Ireland knows her songs. I met an old turnpike keeper, (who also had his pipe,) and could talk and sing without removing it. He told me he had a lot of songs, and he began singing one, to which I said: "I know that." I remembered away back how I had learned it, how my oldest brother had brought it from college. The old man said: "Do you know Tom Moore?" He sang: "Those Evening Bells," and he pointed out the bells, and he said: "Tom Moore wrote the song right under the shadow of those bells." I was sorry to leave Ireland; a warmer-hearted people never lived and they have, know, and love their songs.

But let us cross into Scotland. We say that "blood is thicker than water." My mother is Scotch, and remembering the Tom Moore of Scotland,—"Bobby Burns," I went to the place where he is buried,—Dumfries. I was traveling in the care of the Kings Arms Hotels, and finding their bus at the station, I sat therein and looked about. Soon I saw two people, a tall lady and a little man, and the lady was evidently giving the little man orders. We later drove in silence to the hotel. I was shown to my room, and I thought nothing more about them. A little maid came up and asked me if I would not come down and have a cup of tea. I went down, and there I saw the tall lady and the little man. The lady said to me: "Will you have a walk with us?" And we started out. Now at home I am rather praised for my walking ability, but I walked and walked with the two strangers, in a strange country, six miles, and very few words were spoken all that while. Stopping finally, the woman turned to me and said: "Have you ever heard "Maxwelton's braes are bonny?" This is Maxwelton, and over there is the little church where he and I were married 28 years ago, and we went straight to Australia. We have just come back to the Islands, and I could not go back without coming to Maxwelton. Mind you it is the bonniest spot in all the world." (The priest had said that about Killarney). She turned to the little man, and said: "Sing," and he began to sing, and in the second stanza the wife joined. They sang the third stanza, both faces wet with tears. After they had finished, the lady said: "Do you like that song?" "Do you know it is the best love song in all the world?" She added: "Go to Edinburgh library and see for yourself." A few weeks later I was there, and saw its record: that for simplicity, chastity, and beautiful melody and words, "Annie Laurie" is the type of the world's sweetest love songs.

My friends, 62 per cent. of the songs that are written now-a-days are the songs that are written about what we call "love," and of that 62 per cent. 80 per cent. insinuate that the divorce court will take care of conditions that are not happy, "so don't be too serious." What kind of a song is that, and how does it compare with the song of "Annie Laurie" which is the typical, clean, fine love song? Only to-day I had a new bit of treasure regarding love songs, and "Annie Laurie" particularly. I talked with a woman who told me that her father, who was a British naval officer in the Crimean war, said that they all stood while over the trenches the boys all began to sing "Annie Laurie," and one of the men said: "I know she is *thinking of me, too.*"

I would not leave Scotland in two hours if it were not wrong to keep you so long. But before leaving it I must tell you that in the north of Scotland, I discovered something more regarding our American song-making. The Kiltie band knew that I was there to learn Scotch songs, so with much pains they prepared a program. Thirty-nine Kilties sent me an invitation to come. After the marching and countermarching, the first song was begun,—a bitter disappointment to me, for it was not going to be Scotch at all. With much pains they had prepared an American program. I love American things, but they played for me, with all the appreciation of a thing done to please somebody else, what the leader told me was an American song, and I said: "No, no, no." But he was Scotch, and he said: "I ken it is." And what was the song? It was "After the Ball is Over," truly written by an American. You remember it, and so do I. Then they played a second song, and it was like unto the first. It was: "Hot time in the Old Town Tonight." And they began a third song, and at the close of it they said to me: "We learned that in Germany." I replied: "I think it is the best American song that we have." I wish to speak of it again in just a moment as the best American ballad. At this time the conviction came to me that at home, in America, there are some good songs, and I would go back and try to discover how new we are as a country and how far along we are in song building. So I came back, not forgetting as I passed London that there an American had immortalized himself by writing the best home song that was ever written,—"*Mid Pleasures and Palaces,*" by John Howard Payne.

Hardly had I landed home before I wrote to President Theodore Roosevelt. I had heard that he had said: "If we are to have American songs we are going to have them through the old slave hymn of the South. The colored man is going to give us the basis for our best American songs." So I wrote to Mr. Roosevelt who directed me to get in touch with Booker T. Washington, who would direct my itinerary. I wrote immediately to Dr. Washington, and I said to him: "Will you help me to get the genuine old slave hymns of the South? He wrote back a letter beginning with a sentence that I shall never forget. He said: "*If you are sincere* I shall do all in my power to help you to get the old slave hymns." During that winter he helped me all he could; he told me where to go, to whom to go; he wrote letters ahead. The chief thing I got, let me say, was my own ability more or less to know what a real negro hymn is. I learned it through a very primitive camp meeting. Briefly it was this way. Four ministers arose, and they all preached from

different texts, and it was a sort of a case of the "survival of the fittest," for one by one they dropped out, and the remaining one proceeded to sing the rest of his sermon, repeating his text as the main stanza, the audience composing and harmonizing the chorus.

At Farmers' Week at Cornell last year, after we had had three or four days of talking and singing songs that live, one young man spoke to me. He was to be married next June, and he wanted to know about songs that would be good for his home. Together we made a list of songs with which to start the new home. Shortly after that an old man came to me. He was white of hair and white of face, and feeble of manner, and he said to me: "I like the songs you have been singing all week, but somehow my heart keeps turning to the home songs of the other land." The young man about to found his earthly home wanted the right sort of song. But the old man was thinking of what we call the Heavenly home, and he asked me: "Do you know: 'I've reached the land of corn and wine'?" He sang it, and I joined. He sang another song, and that song I love for it is simple and so much a song of my childhood. And last winter when at State College I asked the college boys if they knew it, few did. But we who did joined in singing it, and to them all I said my thought of why so simple an old hymn should be sung the world over. We here can sing it better, understanding it better. Let us all sing it. It is: "In the Sweet Bye and Bye."

There is yet another hymn which all the world knows and sings. Why? Because it is the prayer of the universal heart,—simple but great. Written as the prayer of one soul trying to voice its need of Almighty aid it has become the hymn-prayer of all the world. Let us join in singing it: "Nearer my God to Thee."

Few there be of that great family of persons whose childhood lies well in the past who do not consciously realize from such an inheritance. A very few songs may constitute their riches and these of little intrinsic merit, a mother's bedtime croon, a father's simple old hymn, a family chorus or glee, some favorite from old days that association has kept. Yet no price could buy this heritage of song.

The sons and daughters of other lands, seeking better opportunities for living for themselves and for their children, cross to the American shore. In Pennsylvania are to be found thousands of men, women, and children whose native land lies far away from this new home of their adoption. Many families that thus bravely began home-building in a strange country brought with them very little of this world's goods, yet not one came without a heritage of song as a gift to the community into whose life the members of that family went to become citizens. In many instances we have heard the fathers and mothers in their farm homes,

"Sing to their sons those melodies,
Those songs their fathers sung."

How welcome such songs are with their age-long standards of loyalty and purity and truth! Songs that have lived years and centuries in the Old World because they sang of country, and home, and mother, and God, should go on living in the New World, singing of country, and home, and mother, and God. Richard of Saltoun said, "Let me write the songs of a nation and I care not who makes its laws." Sing the songs of the country whose blood you bring to America

and you will help make the laws that must best govern song-making and song-singing in this "land of the free and home of the brave." If we are to become a music-loving nation, we must have American music; it must smack of our soil; it must embody the character and express the tendency and trend of American life; it must bear the marks of our weal and woe; it must show in strongly marked rhythms the effect of our developed and developing national energy; it must be the faithful interpreter of the true American.

Has the song lived? Will the song live? In addition to all technicalities of a song, there is another, which we may call the test of personal possession. Does or will the song live for me, the individual? Has it a place in my life for reasons personal and of value to me? Has it had the power with me to suggest thought, action, habit, character? As memory, does it leave me unashamed and glad to recall it? Is it a song by which I shall be happy to have my children remember their home?

Are our home, school, community songs the bearers of good and imperishable associations? They may be recent, but more than likely they are "good songs to us because they are the songs of our early homes. They have stood the test of personal possession. These songs are the children's heritage songs, which through a long life they will respond to because child and song grew and lived together.

The CHAIRMAN: Do any one of you wish to speak a few words before we close the meeting?

DIRECTOR MARTIN: Just a moment; there is a photographer here waiting at the outer door, who desires to take a picture of this Convention, and we would like to have you all, when you adjourn, repair to the porch in order that he may take that picture.

The CHAIRMAN: Do I hear from anyone who wishes to speak? While casting my eyes on the program, I noticed the subject, "Songs that Live;" and that brought to my mind, this pleasant meeting that we are having here, enjoying ourselves in peace and safety, in happiness and security, while two-thirds of the world's people are at war with each other. One thought struck me and it was this; that it would be appropriate for us before we adjourn to sing at least one or two verses from that hymn that we hope will never die, our national hymn, and I will call on Brother Posten to lead us in the first and last verses of that hymn, "America."

(After singing "America," the meeting adjourned).

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BULLETIN No. 268

Milk, Butter and Feeding and Management of Dairy Cows

BY

Prof. C. B. Cochran, Prof. H. E. Van Norman
Mrs. Jean Kane Foulke



N. B. CRITCHFIELD, *Secretary of Agriculture.*
JAMES FOUST, *Dairy and Food Commissioner.*

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PREFACE.

The rapidly increasing interest in Dairy-husbandry, not only in Pennsylvania but throughout the United States, has led to the important inquiry as to which of several dairy breeds of cattle are the most profitable.

The most popular of the dairy breeds in Pennsylvania seem to be the Holstein, brought from Holland by the early Dutch immigrants from that country to New York and the Jersey and Guernsey imported from the English Channel Islands in the early part of the last century.

The relative value of these respective breeds has become a subject of popular discussion not only among the dairymen of our State but among consumers of dairy products. .

The very large quantity of milk yielded by the Holstein attracts special attention to this breed, not only on account of the constantly increasing importance of our milk market but as a butter producer, while the Jersey and Guernsey are held in high esteem on account of the comparatively large quantity and superior quality of butter they produce.

There is, however, one subject in which all dairymen, whether producing butter or milk, are equally interested, namely, the Feeding and Proper Management of Dairy Cows. Other subjects of special importance to butter makers are, The Handling of Milk and Cream, Care of Utensils Used and the proper treatment of butter from the time it is taken from the churn until it reaches the market.

In order that the scientific side of all these important subjects may be brought to the attention of dairymen as well as their patrons, Hon. James Foust, Dairy and Food Commissioner, has had a special investigation made, showing a comparison of the properties of the milk of the three breeds of dairy cattle that hold most prominent places in Pennsylvania, the report of which is found in the following pages, to which is added a very superior paper read by Prof. H. E. Van Norman, formerly of State College, Pa., before the Annual Normal Farmers' Institute at Towanda, Pa., in 1912, on the

"Feeding and Management of Dairy Cows"; and a like interesting paper on **"Essentials of Butter Making,"** read by **Mrs. Jean Kane Foulke,** of West Chester, Pa., before the **Annual Normal Institute** held in Lancaster, Pa., in 1911.

The publication of the Report and Papers referred to as a Bulletin of the Department of Agriculture, is authorized on account of their special value to the Dairy industry of the State.

N. B. CRITCHFIELD,
Secretary of Agriculture.

LETTER OF TRANSMITTAL.

Harrisburg, Pa., August 4, 1915.

Honorable N. B. Critchfield,
Secretary of Agriculture,

Harrisburg, Pa.

Dear Sir:—I have the honor to transmit herewith a comparison of the composition of the milk of different breeds of cows by Professor C. B. Cochran, West Chester; also feeding and management of dairy cows by Professor H. E. Van Norman, State College, Pa., together with essentials of butter making by Mrs. Jean Kane Foulke, of West Chester, with the recommendation that it be published as *Bulletin No. 268* of the Department.

Very respectfully,

JAMES FOUST,
Dairy and Food Commissioner.



A COMPARISON OF THE COMPOSITION OF MILK OF DIFFERENT BREEDS OF COWS.

By Professor C. B. Cochran, West Chester.

The fact that certain breeds of cows, such as the Holstein, Dutch Belt, and Shyrshire, yield a milk low in fat and in total solids, while the milk of the Jersey and Guernsey breeds is high in both of these constituents, is quite generally recognized.

There are, however, other characteristic differences in the milk of these breeds which are not so well known and to which attention has only recently been directed. In an article by H. C. Lythgoe, published in the Journal of Engineering and Industrial Chemistry, for November, 1914, is given a long list of the analyses of the milk of different breeds of cows. From this article, from the reports of the New Jersey Agricultural Experiment Stations, and from other sources, as well as from my own work, are derived the figures given in the following table, to show the average composition of the milk of each of these breeds.

TABLE I.—Showing Average Composition of Milk of Different Breeds of Cows.

	Holstein-Friesian.	Jersey.	Guernsey.
	%	%	%
Total solids,	12.06	14.23	14.89
Fat,	3.46	6.36	6.12
Milk sugar,	4.76	4.96	4.92
Proteins,	3.80	3.77	3.76
Ash,	0.70	0.74	0.76
Solids not fat,	8.60	9.47	9.44
Solids not fat to 100 pts. water,	9.77	11.11	11.66
Ratio of fat to solids not fat,	40.2 to 100	10066.6 to 100	54.2 to 100
Fat in total solids,	28.6	36.3	35.3
Milk sugar in solids not fat,	55.2	52.3	52.1
Proteins in solids not fat,	37.2	40.0	39.7
Ash in solids not fat,	8.15	7.8	8.0

An inspection of this table shows that there are less solids not fat, and fat in proportion to the water in the milk of the Holstein-Friesians than in Jersey or Guernsey milk. The ratio of fat to solids not fat is about four-tenths in Holstein milk, while in Jersey and Guernsey milk the ratio is about fifty-five-hundredths. The fat forms a much smaller percentage of the total solids in Holstein milk than in Jersey or Guernsey milk.

In the solids not fat of Holstein-Friesian milk, there is a higher percentage of milk sugar and ash and a lower percentage of protein than in the milk of either the Jersey or Guernsey breeds.

The following table is abbreviated from one of the tables in H. C. Lythgoe's article, to which reference has been made. The figures in the four lower rows have been calculated by myself and added to the original table. The figures in the upper row, opposite number of samples, 36, 28, 41, and 56, indicate the number of individual cows from which the samples were taken, while the number 47 indicates that the mixed milk of 47 different herds were examined.

The percentage of fat in total solids is here seen to be distinctly greater in the Jersey and Guernsey milk than in the Dutch Belt and Holstein, while the percentage of ash in solids not fat appears to be distinctly greater in the Holstein milk than in the other breeds. The percentage of milk sugar in the solids not fat is somewhat higher in the milk of the Dutch Belt and Holstein cows than in the milk of the Jersey and Guernsey breeds.

TABLE II.—Summary of Analyses of Milk of Known Purity.

		Jersey.	Guernsey.	Dutch Belt.	Holstein.	Herd milk.
No. of samples,		36	28	41	56	47
Total solids,	Max.,	17.17	17.00	14.09	13.90	14.87
	Min.,	13.43	13.15	10.93	10.29	11.56
	Ave.,	14.75	14.60	12.15	11.69	12.79
Fat,	Max.,	7.70	6.40	4.75	4.00	5.40
	Min.,	4.20	3.80	2.00	2.45	2.25
	Ave.,	5.65	5.23	3.56	3.41	4.03
Proteins,	Max.,	4.43	5.01	3.61	4.08	4.07
	Min.,	2.79	3.26	3.34	3.00	2.65
	Ave.,	3.46	3.73	3.56	3.27	3.21
Ash,	Max.,	0.84	0.84	0.77	0.84	0.79
	Min.,	0.64	0.69	0.63	0.64	0.65
	Ave.,	0.73	0.75	0.70	0.73	0.74
Milk sugar,	Max.,	5.80	5.22	5.25	5.20	5.25
	Min.,	4.10	4.46	4.20	4.05	4.35
	Ave.,	4.94	4.84	4.96	4.70	4.83
Solids not fat,	Max.,	9.90	10.65	9.43	9.61	9.43
	Min.,	8.13	8.00	7.63	7.55	7.62
	Ave.,	9.10	9.37	8.59	8.28	8.70
Fat in total solids,	Max.,	47.4	33.6	31.3	36.5	37.1
	Min.,	33.1	31.0	26.3	25.0	26.3
	Ave.,	38.3	35.9	29.9	29.2	31.6
Ash of sour milk serum,	Max.,	0.832	0.824	.....	0.809	0.853
	Min.,	0.740	0.776	.....	0.730	0.784
	Ave.,	0.788	0.804	.....	0.768	0.793
Solids not fat to 100 parts water,	Ave.,	19.87	19.85	9.66	9.28	19.04
	Ash in solids not fat,	7.91	8.00	5.15	5.00	5.44
	Milk sugar in solids not fat, ...	54.3	51.6	57.4	56.7	55.1
Protein in solids not fat, ....	.....	33.0	30.8	34.4	33.2	37.7

In addition to this table, Dr. Lythgoe has kindly furnished me further data which is explained by the accompanying letter and the table following it.

**"MASSACHUSETTS
STATE DEPARTMENT OF HEALTH.**

"Mr. C. B. Cochran,
West Chester, Pa.

Boston, July 20, 1915.

"Dear Sir:—In response to yours of June 28th, I beg to inform you that the enclosed are the analyses of the samples of Jersey, Guernsey, and Holstein milk, giving the highest and lowest solids and fat of those recorded in my article published in November last.

"The numbers 36, 28, and 56 represent the number of different cows from which the samples were taken. The samples of herd milk were taken from 47 different herds."

"Yours truly,

(Signed) HERMAN C. LYTHGOE,
"Director, Division of Food and Drugs."

TABLE III.

	Solids.	Fat.	Proteins.	Ash.	Solids not fat.	Lactose.
Jersey,	17.17	7.70	3.65	0.72	9.47	5.05
Jersey,	12.43	4.80	2.96	0.63	8.13	4.80
Jersey,	12.80	4.20	2.97	0.67	8.60	5.10
Guernsey,	17.00	6.35	4.93	0.80	10.66	4.92
Guernsey,	16.83	6.40	4.63	0.82	9.63	4.78
Guernsey,	13.15	4.15	2.26	0.69	8.00	5.05
Guernsey,	12.23	3.80	2.98	0.75	8.47	4.70
Holstein,	13.96	4.35	4.06	0.76	9.61	4.82
Holstein,	13.84	4.60	3.71	0.70	9.24	4.73
Holstein,	10.20	2.65	2.40	0.65	7.55	4.50

TABLE III—Continued.

	Copper serum refraction.	Sour serum refraction.	Sour serum ash.	Ratio of fat to solids not fat.	Solids not fat to 100 pts. water.	Ash in solids not fat.
Jersey,	39.5	.....	.....	81.3 to 100	11.43	%
Jersey,	37.4	40.7	0.789	52.9 to 100	9.23	8.13
Jersey,	38.2	40.0	0.740	48.8 to 100	9.86	7.80
Guernsey,	38.9	.....	.....	59.6 to 100	12.80	7.61
Guernsey,	37.5	.....	.....	65.4 to 100	11.86	8.61
Guernsey,	37.4	.....	.....	62 to 100	9.11	8.55
Guernsey,	37.4	.....	.....	44.8 to 100	9.65	8.55
Holstein,	37.9	.....	.....	46 to 100	11.16	7.91
Holstein,	38.0	.....	.....	49.3 to 100	10.72	7.57
Holstein,	36.5	.....	.....	35.1 to 100	8.41	8.61

In Table III is given the result of the analyses of the samples of milk taken from the 36 Jersey cows, 28 Guernseys, and 56 Holsteins which gave the highest and lowest figures for total solids and fat. It will be noticed in this table that an increase in total solids is not always attended by an increase in butter fat, and solids not fat, but may be due to an increase in either one or the other of these constituents. For example, the sample of Jersey milk containing 12.43% of total solids has 4.3% of fat while the sample containing 12.80% of total solids has only 4.20% of fat.

The columns headed ratio of fat to solids not fat; solids not fat to 100 quarts of water; and ash in solids not fat have been calculated and inserted by myself. The column giving the ratio of fat to solids not fat shows that in Jersey and Guernsey milk, the fat is almost always more than one-half as great as the solids not fat, and may, in extreme cases, be more than eight-tenths as great as the solids not fat; while in Holstein milk the fat is less than one-half as great as the solids not fat, and may fall to about one-third.

The column headed ash in solids not fat shows that, even in these extreme cases, the percentage of ash in the solids not fat of Holstein milk is as high as that found in Jersey or Guernsey milk.

The morning and evening milk of each cow in two herds was recently analyzed by me. In one of these herds were five grade Holsteins; in the other fourteen. The following tables give the results of the average of the morning and evening tests of each of these cows in each dairy. The samples were all taken by Mr. G. M. Pelton, one of the agents of the State Dairy and Food Department. The cows were milked in his presence, and in each case the milk was well mixed before taking sample.

TABLE IV.—Dairy No. 1.

No. of Cow.	Sp. Gr.	Fat.	Total solids.	Solids not fat.	Solids not fat to 100 pts. water.
1,	1.0314	3.55	12.87	8.32	10.07
2,	1.031	3.05	11.56	8.51	9.68
3,	1.0296	2.65	10.70	8.06	8.95
4,	1.032	3.30	12.20	8.90	10.13
5,	1.0315	3.17	11.31	8.63	9.78
Ave. of five cows,	1.0311	3.24	11.73	8.58	9.72

TABLE V.—Dairy No. 2.

No. of Cow.	Sp. Gr.	Fat.	Total solids.	Solids not fat.	Solids not fat to 100 pts. water.
		%			
1.	1.0513	3.95	11.47	8.53	9.63
2.	1.0505	3.22	10.38	8.16	9.14
3.	1.0308	2.70	10.91	8.21	9.21
4.	1.0517	3.60	12.49	8.86	10.1
5.	1.0315	2.90	12.71	8.81	10.1
6.	1.0296	2.55	10.43	8.00	9.05
7.	1.032	2.95	11.63	8.68	9.78
8.	1.030	3.50	11.85	8.35	9.49
9.	1.0306	2.45	11.95	8.50	9.65
10.	1.0512	2.45	12.10	8.66	9.91
11.	1.0308	2.75	11.08	8.23	9.30
12.	1.0307	2.05	11.45	8.40	9.49
13.	1.0306	2.25	11.75	8.50	9.63
14.	1.030	3.50	11.86	8.36	9.90
Ave. of the 14 cows,	1.0307	3.12	11.58	8.45	9.60

The average of the ten analyses of the morning and evening milk of the five cows of Dairy No. 1 is distinctly below the legal standard of 12% for total solids, and slightly below the standard of 3.25% for fat. In Dairy No. 2, the average of the morning and evening tests of the fourteen cows gives results distinctly below the legal standard in both total solids and fat. The Holstein cows are noted for their abundant flow of milk, and they have been bred for a very large number of generations for the special purpose of producing quantity of milk with either little or no regard for quality. On the other hand, in the breeding of Jersey and Guernsey cows, richness in butter fat has been the primary object. In each of these processes, the tendency is to the production of more or less abnormal milk. It should be remembered that the primary purpose of the milk of the cow is to serve as food for the new born calf. Under the primitive conditions of nature, the milk of the healthy normal cow would be approximately, at least, a perfect food for the young calf, and such milk would constitute a normal milk, as determined by nature. But when man interferes, and attempts by a process of selection to increase the percentage of butter fat in the milk, or to increase as far as possible the quantity of milk, which results in an increased percentage of water in the fluid, he is, by breeding and selection, producing animals incapable of furnishing to their own young a suitable food, or, in other words, a normal milk.

Many years ago, I stated at a meeting of the Guernsey Breeders Club that, in my opinion, the milk of Guernsey cows containing all its fat was too rich a food for very young infants. One of the members present expressed opposition to my view. A newspaper report of the proceedings of the next meeting of this same club stated that a conclusion had been formed by the members that Guernsey milk was too rich for new born Guernsey calves. Whether my opinion or that of the club is correct or not, in this case, the general fact that breeding tends to the production of a milk that is abnormal in the sense that it is not suited to its natural function is undoubtedly true.

Another interesting phase of this subject is to be found in the difference in quantity and quality of cows' milk according to the length of time since the birth of the calf. It is a well known fact that in the early stages of lactation a cow gives a large quantity of milk of comparatively poor quality; and, as the period of lactation approaches its end, the quantity decreases, while the richness of the milk increases. So that the percentage of fat in the product near the end of lactation may be more than double what it was at the beginning. This fact, which is universal in all herds, evidently means that, as the age of the young calf advances, it is able to utilize a more concentrated food.

While it is evidently possible to produce a milk abnormally rich, in the sense that it is not suited to its natural function, it is also possible to produce a milk abnormally poor in exactly the same sense. The production and sale of such abnormally poor milk for household use is undesirable, both in a physiological and in a commercial sense.

The food value of a quart of milk depends not upon the percentage of water, practically a free product, which it contains, but upon the percentage of actual food solids. A quart of milk, containing 11% of solids, other conditions being the same, is worth only eleven-fifths as much as a quart of milk containing 15% of solids. In other words, breeding for quantity of milk, when carried to its extremes, becomes only another way of watering the product. It is, therefore, in my opinion, distinctly within the province of the State to fix legal limits for fat and total solids, and this is especially true, so long as milk is sold, as it now is, at a uniform price per quart, without regard to its actual food value.

A determination of the ratio of solids not fat to water furnishes a valuable addition to the methods now used for the detection of added water in milk.

It will be noticed that in case of the two dairies furnishing the remarkably low figures given in the preceding tables, the ratio of solids not fat to water is 9.72 to 100 and 9.60 to 100 and I think it is safe to say that the milk from these herds represents about the lowest limit of pure milk from healthy cows to be found upon our markets. Consequently, when the ratio of solids not fat to water falls below 9.60 there would be a cause for suspecting the presence of added water.

The ratio of solids not fat to water in a given sample of milk will remain the same in the skim milk and in the cream as in the original milk, although the actual figures for solids not fat in the milk, skim milk and cream will differ considerably. This fact is well shown by the figures given in the following table:

TABLE VI.—Showing Relation of Solids Not Fat to Water in a Given Milk, and in the Cream and Skim Milk Derived Therefrom.

Number.	Sample.	Total solids.	Fat.	Solids not fat.	Solids not fat to 100 pts. water.
1	Milk,	12.11	2.2	8.81	10.02
2	Cream from No. 1,	37.14	30.3	6.84	10.02
3	Skim milk from No. 1,	9.11	0.0	8.11	10.02
4	No. 2 100 pts.—No. 1 20 pts.,	22.00	26.2	6.80	10.14
5	No. 4 100 pts.—No. 1 20 pts.,	29.68	22.3	7.16	10.12
6	No. 6 100 pts.—No. 1 20 pts.,	26.77	19.3	7.57	10.20
7	Milk from 1 Holstein cow,	12.15	2.3	8.85	10.01
8	No. 7 partly creamed,	15.90	7.50	8.40	10.00

It will be seen from the results given in this table that while the actual per cent. of solids not fat in samples 1, 2, and 3, representing the milk, cream, and skim milk, are very different the ratio of solids not fat to water in the three samples is constant.

Furthermore, the ratio of solids not fat to water is also constant in samples 4, 5, 6, and 8, which are mixtures of cream and milk in different proportions.

In view of these facts, a consideration of the ratio of solids not fat to water furnishes valuable assistance in the detection of a watered milk containing cream.

Occasionally very abnormal samples of milk have been received from agents of the State, and among them were some which contained added water and an excess of fat, the latter being due either to the fact that the milk had partially creamed before the sample was taken, or contained cream intentionally added.

The influence of added water on the ratio of solids not fat to water in milks containing varying quantities of butter fat or cream is shown in the following table:

TABLE VII.

Number.	Sample	Total solids.	Fat.	Solids not fat.	Solids not fat to 100 pts. water.
1	Milk,	12.20	3.6	8.60	9.79
2	Cream,	23.14	26.6	6.54	9.77
3	80% No. 1,	16.22	3.2	8.12	9.70
4	90% No. 1,	11.08	3.3	7.78	8.74
5	10% water,	15.41	3.0	7.41	8.70
6	80% No. 2,	12.62	4.0	8.62	9.86
7	90% No. 2,	11.86	3.6	7.76	8.76
	10% water,				

Sample No. 1 is milk somewhat below average in quality, the product of one herd of cows. No. 2 is cream from the same milk, and No. 3 is a mixture of 80% of the milk and 20% of the cream. In these three samples, the ratio of solids not fat to water is constant, although the actual percent. of solids not fat differs considerably. But in sample No. 4, which contains 10% of added water, the solids not fat to 100 parts of water is strikingly decreased, and is lower than in any of the samples of exceptionally poor milk, obtained from grade Holstein cows, that furnished the results given in the preceding tables under Dairy No. 1 and No. 2. In sample No. 5, which contains 8% added water, the low solids not fat might possibly be attributed to the fact that the sample contains an excess of fat; for an inspection of the preceding tables will show that in the creaming of milk there is a decided lowering in the per cent. of solids not fat. If, however, we turn our attention to the solids not fat associated with 100 parts of water, we find that there is a very marked decrease in this figure, and the preceding tables have shown that this decrease should not take place if both the cream and the milk are pure. In this case, the decrease is so great that the figure falls much below the limit for pure herd milk, even of the lowest type.

The ratio of solids not fat to water will not take the place of other methods used for detecting added water, but it is a valuable addition and may be used to save the chemist unnecessary labor.

For example, in No. 5 the solids not fat are 7.41% and the total solids are 15.41%. From these figures, the ratio of solids not fat to water is found to be 8.70 to 100. This indicates that a further examination should be made, including estimation of ash, etc.; but, if the solids not fat in the sample had been as high as 8.10%, the ratio would have been 9.57 to 100, and would indicate that the milk was probably pure, and that a further examination would furnish no proof of adulteration.

In case of very rich milk such as that furnished by Jersey and Guernsey breeds, a determination of fat, total solids, and specific gravity does not give sufficient information for the detection of a small amount of added water. This fact is made clear by the figures given in the following table:

TABLE VIII.

Number.	Sample	Specific gravity.	Total solids.	Fat.	Solids not fat.	Solids not fat to 100 pts. water.
1	Cream, .....	.....	44.36	33.7	5.68	10.17
2	Milk,	1.033	14.73	5.5	9.23	10.33
3	1 Jersey cow, .....	.....	.....	.....	.....	.....
4	4 vols. No. 2,	1.023	19.36	12.2	8.25	10.23
5	1 vol. No. 1, .....	.....	.....	.....	.....	.....
6	9 vols. No. 2,	1.029	13.27	4.9	8.37	9.65
7	1 vol. water, .....	.....	.....	.....	.....	.....
8	4 vols. No. 4,	1.0285	19.14	11.40	7.74	9.57
9	1 vol. No. 1, .....	.....	.....	.....	.....	.....
10	Milk,	1.0315	16.55	6.90	9.65	10.97
11	1 Jersey cow, .....	.....	.....	.....	.....	.....
12	9 vols. No. 6,	1.029	14.91	6.2	8.71	10.29
13	1 vol. water, .....	.....	.....	.....	.....	.....
14	Milk,	1.0335	14.51	5.0	9.51	11.13
15	1 Jersey cow, .....	.....	.....	.....	.....	.....
16	9 vols. No. 8,	1.0305	13.27	4.5	8.77	9.30
17	1 vol. water, .....	.....	.....	.....	.....	.....
18	Milk,	1.0323	13.46	3.9	8.56	10.20
19	1 cow, .....	.....	.....	.....	.....	.....
20	9 vols. No. 10,	1.0295	11.70	3.5	8.20	9.25
21	1 vol. water, .....	.....	.....	.....	.....	.....

Sample No. 4 in this table is the milk of one Jersey cow (No. 2) to which ten per cent. of water has been added. The effect of the added water is clearly shown by a comparison of the figures in row 2 with those in row 4. If, however, the sample of milk No. 4 had been received by a chemist who had no knowledge of its origin, he would probably regard it as abnormal because a milk containing 4.9 per cent. of fat is not usually associated with such a low specific gravity as 1.029, nor so low a per cent. of solids not fat as 8.37. But this abnormality may be due to either of two causes. It may be a rich milk

containing added water (which in this particular case is true), or it may be a pure milk partially creamed. A milk having a specific gravity of 1.030, total solids, 11.90%, fat 3.5%, solids not fat, 8.40, would, when creamed, so as to have 4.9% of fat, give the remaining figures as represented in No. 4; and a milk containing 3.5% of fat and 8.40% of solids not fat would not be exceptional, particularly if it represented the product of one or a few cows. The truth of this statement is shown by the results of analyses of samples 9, 10, and 14, Table V, Dairy No. 2.

Sample No. 7, also containing 10% of added water, might be produced by the partial creaming of a poorer milk.

Sample No. 9, with its 10 per cent. of added water, shows from the figures here given no evidence of adulteration, and would probably pass inspection.

Sample No. 11, which is produced by the watering of a milk of medium quality, would require a much more extended examination before the presence of water could be safely declared.

In spite of the wide variation in composition of milk and the consequent possibility of an occasional sample of watered milk escaping detection, I believe that the adulterations that actually occur are in the great majority of cases sufficient to make themselves evident to the chemist. The following very evident case of adulteration of milk with added water is an extreme illustration of a type of samples, to which reference has been made, that are not only watered but also creamed. In many cases the evidence is not as strong as in this one. The results of analysis are:

Specific Gravity.	Total solids.	Fat.	Solids not fat.	Ash.	Solids not fat to 100 parts water.
1.035,	11.38%	4.36%	6.92%	0.57%	7.79

The percentage of fat in this sample taken alone indicates a pure milk of good quality. All the other figures prove clearly and positively the presence of about 20% of added water. A milk sufficiently rich in fat to show 4.36% of fat after the addition of 20% water would be associated with sufficient solids not fat and total solids to require the addition of at least 25% of water to reduce them to the figures given in this sample; and if 25% of water were added, the fat in

the original sample would have to be 5.8%. In other words, in order to produce the figures obtained by analysis of this sample, by simply watering normal milk, the milk before watering would have to contain at least 15% of total solids and 5.8% of fat. Herd milks of this character can be found but they are extremely rare. In fact, so rare that one may assert with reasonable certainty that the sample in question is the result of both watering and creaming.

In this paper it has been my purpose to present the possibilities of detecting the presence of added water in milk by a determination of the total solids and fat. From this data one can calculate the solids not fat associated with 100 parts water.

If none of these four figures furnish grounds for suspicion it is not likely that a more complete examination of the sample will furnish evidence of adulteration either by watering or skimming.

In the detection of skimming, the relation of the fat to the solids not fat is a matter of primary importance. For example, a sample of herd milk contains 3.25% of fat. If the solids not fat are between 8.3 and 8.7% it may be a pure milk of low grade. See Table IV, Dairy No. 1. If the solids not fat fall to 8%, the milk is probably watered, and should receive further investigation. If the solids not fat rise to 9%, the milk has been partially skimmed.

We have seen that the ratio of fat to solids not fat is very different in poor milk and in rich milks. In other words, the ratio varies with the percentage of fat. In a normal milk, containing 3.25% of fat, the solids not fat will be from 2.5 to 2.6 times the fat; while in a milk containing 4% of fat, the solids not fat will be from 2.2 to 2.3 times the fat. If the fat falls to 2.7%, the normal solids not fat would be about 3 times 2.7, but if it rises to 5% the solids not fat would be about 1.9 times the fat.

BUTTER.

By Prof. C. B. Cochran, West Chester, Pa.

In undertaking to write about butter my thoughts are so strongly directed to the butter making of the past that I cannot refrain from briefly relating the process as I have seen it. Perhaps the history of the manufacture of no other familiar article of food will better illustrate the wonderful changes that have taken place in domestic and industrial life during the last fifty years.

In my boyhood days butter making did not constitute a business in itself because it formed one of the many smaller or subordinate industries to be found on every farm at that time. In every village or small town not exceeding a population of 2,500 to 3,000 souls, the possession of a cow by each well-to-do family was quite common. In such towns there was no place for a milk dealer. Each family who did not have its own milk supply, sent to a neighbor. Going after the milk was one of the daily duties of many a boy of the past generation.

While butter was a product of every farm, on none was it anything more than one of the several side issues. Every farmer kept a few cows, but no farmer kept a large herd. Butter was made, sufficient for the family use and, for at least a part of the year, the housewife would have a few pounds each week to exchange at the neighboring store for coffee, sugar, or such other groceries or dry goods as were needed for the home or for some of its members.

In those days all the expenses for the maintenance of the home, including furniture and clothing for the family, were quite generally supplied by the subordinate industries or side issues of the farm, the sale or exchange of small fruits, chickens, eggs, an occasional pig or a sheep furnished running expenses, leaving the money obtained from the sale of the farm crops such as apples, potatoes, wheat, hay, &c., to be used for paying a mortgage, for improvements, or for investment.

Those were primitive days of simple life with many thoroughly enjoyed pleasures, but also with much hard manual labor for young and old of both sexes; days when the farmer's family enjoyed social and political supremacy and when the aristocracy of the land were in the country raising wheat and potatoes on farms of less than 200 acres and trading at the village store the minor farm products for household provisions.

The following method of butter making was at that time very generally used in my native state:—Shallow pans about 13 inches in diameter were filled with milk to the depth of about two inches and allowed to stand until the creaming process was completed. As it was desirable to keep the milk at a low and uniform temperature, and as the cellar was the only available place approximately furnishing such a temperature, this operation was conducted in the cellar.

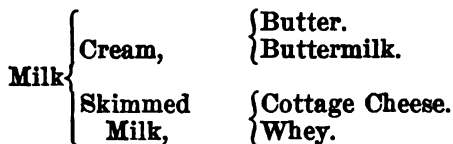
When the rising of the cream was completed, it was skimmed off and transferred to a stone jar where it was allowed to ripen until a sufficient supply had been collected to form a churning. In each household this time was subject to some variation, depending upon

the varying consumption of milk by the family. During the time of harvesting of hay, wheat, and oats, when many hands were employed and fed at the family table, the intervals between churning would be somewhat increased.

The operation of churning was conducted in a tall cylindrical or slightly conical jar made of wood or stone and provided with a lid through a hole in the center of which passed the handle of the churn dasher. The operator, usually one of the younger members of the family whose time could be spared for this necessary, but tedious, work, protected by a long apron from the spattering cream, kept this handle moving up and down until the butter had formed. As the time for the production of the butter varied greatly, the young operator frequently possessed aching arms long before the process was completed and his or her attention was fixed upon the ring of cream around the hole in the lid through which passed the handle of the dasher, watching eagerly for the first appearance of butter granules which announced approaching release from the task. In after years when I found students in my classes who knew little or nothing of the process of butter making, I felt that they had missed one of the interesting experiences of life. The operation of collecting the butter from the buttermilk, working and salting was carried out by an older and more experienced person in much the same manner as at the present time.

Butter made in this manner varied greatly from time to time in color, consistency, and flavor, and large quantities of butter that would now be considered unfit for a retail market were consumed. Some of the causes for poor butter made under these conditions will be briefly mentioned later in this article.

The diagram here given shows the separations produced in milk in the ordinary process of butter making, whether the cream is obtained by the gravity process or by a centrifugal separator.



By the process of churning and subsequent working, the separation of the cream into butter and buttermilk is never complete, consequently there will be found in the buttermilk a small amount of butter, and in the butter, varying quantities of buttermilk, together with the added salt. Since buttermilk is a complex liquid containing water, milk sugar, lactic acid, proteids (casein) and mineral matter, all these constituents will be found in the butter.

Stated in terms of fat, buttermilk, and salt, the average composition of butter is—fat 86%, buttermilk 12.5%, salt 1.5%.

The composition of butter is practically never expressed in the manner here given, for the reason that buttermilk is itself a complex aqueous liquid of the following average composition:—Water 91.00%, Fat 0.5%, Milk Sugar 4.5%, Proteids 3.3%, Ash 0.75%.

The following table represents the average composition of butter manufactured in different localities:

Made in	Iowa, U. S. A.	England.	France.	Germany.	Denmark.	Sweden.	Australia.
Number of samples,	221	72	5		17	25	
Butter fat,	84.00%	84.95%	84.94%	85.94%	82.41%	82.89%	84.50%
Water,	12.73%	11.64%	12.05	12.24	12.42	13.75	12.70%
Curd,	1.30%	0.59	1.60	1.17	1.30	1.22	1.21
Ash (including salt), ...	1.97	1.02	2.01	1.25	1.87	2.08	1.87

The 221 samples made in Iowa were taken from 55 different creameries located in different parts of the State. The water content of butter made in the same creamery will vary to some extent from day to day. Two successive batches even though made on the same day may show a difference in the amount of water they contain. The average amount of water is said to be slightly higher in butter made in winter than in summer. There is more water in fresh butter than in salt butter and more in butter when first made than when 10 to 30 days old.

Because of the readiness with which a large excess of water may be churned into butter without making it appear abnormally moist many countries place a legal limit upon the amount of water permissible in butter. In the United States, Great Britain, Ireland and Canada, the limit is placed at 16%. In Germany 16% for salted butter and 18% for unsalted butter.

During the year 1902, eight hundred samples of butter were taken for analysis by the Bureau of Animal Industry from 400 different creameries in eighteen different States of the United States. The following table gives the month in which the butter was made, and the highest, lowest and average percentages of water:

Percentage of Water.

Month.	Number of samples.	Highest.	Lowest.	Average.
May,	160	16.40%	7.20%	11.81%
June,	119	17.62%	8.19%	11.91%
August,	377	16.59%	7.23%	11.79%
September,	146	15.28%	8.30%	11.59%
Totals,	802	17.62%	7.20%	11.78%

Of 180 samples of Canadian butter, analyzed in the laboratory of Bureau of Chemistry of that country, 144 contained not over 10% of water, one over 16, and eight 14 to 16 per cent.

That the limit of 16% for the amount of water allowable in butter is a reasonable one, seems to be indicated by the fact that several large countries have independently fixed upon this limit, and also by the results of analyses given in the preceding tables.

The fat of butter differs distinctly in its chemical composition from all other fats used as human food. Fat and oils are chemical compounds of a base called glycerol combined with one or another of a group of substances known as fatty acids. The base of a fat or oil combined with the elements of water furnishes the substance known as glycerine. All fats and oils are alike in containing this base. Their chemical and physical differences are due to the different fatty acids with which this base is combined. Butter fat differs from other fats in the fact that it contains from 6 to 8% of fatty acids that can be distilled at the temperature of boiling water, and it is to the presence in butter of these peculiar fats which yield volatile fatty acids that its distinguishing characteristics and its desirability over other fats as an article of food are due.

A determination of the volatile fatty acids forms one of the most dependable methods of distinguishing butter from oleomargarine, and as a measure of the volatile fatty acids chemists make a determination called the Reichert-Wollny Number. This number, instead of indicating the actual per cent. of volatile fatty acids in the sample, gives the number of cubic centimeters of standard alkali required to neutralize the volatile fatty acids obtained from 5 grams of the fat when the work is performed under certain given conditions. The Reichert-Wollny Number is usually between 24 and 32. The United States Government has adopted 24 as the limit for this number. This limit has been wisely adopted in spite of the fact that it is known that butter made from cow's milk may at times show a much lower R.-W. number.

Examination of butter made in various parts of Holland under different conditions, conducted by the Holland Government, showed a variation from 17 to 32.1, and figures below 20 have been reported from other sources.

Some of the conditions which give rise to these abnormal butters with exceptionally low percentages of volatile fatty acids are now well known. One of the factors producing a very marked influence upon the percentage of volatile fatty acids in butter is the stage of lactation. Butter made from the milk of fresh cows has a high

Reichert-Wollny Number, while butter made from the milk of strippers has an abnormally low R.-W. Number. A sample of butter from the milk of a herd of strippers gave a Reichert-Wollny Number of 17.9, while butter made from the milk of the same cows when fresh gave the exceptionally high number of 36.3.

Another cause for a low percentage of volatile fatty acids in butter was made clear by the investigation of the composition of butter made in Holland conducted by Dr. Van Ryn.

It was found that the milk of cows kept on pasture late in the fall without stabling over night was low in volatile fatty acids. From the abundant data furnished in the report of Dr. Van Ryn the following illustrations are taken. Butter made on Sept. 7th from the milk of a herd of 30 Friesian cows gave a Reichert-Wollny Number of 28.8. Butter made on Nov. 2nd, a few days before the cows were stabled, gave the low number of 20.7. On Dec. 21st, in spite of the fact that many of the cows were approaching the end of the period of lactation, the Reichert-Wollny Number rose to 26.5.

The cause of the low percentage of volatile fatty acids in the butter from cows kept on pasture late in the fall without stabling was attributed to insufficient food and to exposure to inclement weather, but the extent of the influence of each of these factors was not investigated. Numerous examples illustrating the effect of prolonged lactation and late pasturage could be given.

One hundred and sixty-six samples of butter made in 166 factories in October and November from the milk of cows that were stabled every night gave Reichert-Wollny Numbers varying from 28 to 33, and in all but 5 samples this number was 29 or over.

There are many factors upon which the quality of butter depends, and among these factors the one whose importance is perhaps the least of all appreciated is the percentage of volatile fatty acids.

Some 22 years ago a manager of several creameries was placed in the following position:—A large proportion of the patrons of the smaller creameries were delivering milk from herds of strippers. These patrons demanded that payment should be made upon the basis of the percentage of fat in the milk. This the manager refused to do because the butter which he was then making at this particular creamery was no longer up to its usual standard. His customers were complaining and the sale of the butter was decreasing. Nine of these patrons whose herds were strippers left the creamery. When relieved of these strippers and supplied with one or two other dairies composed largely of fresh cows, it was found that the quality of the output was at once greatly improved.

Since this occurred, my attention has been called to several similar cases. From these cases I am led to the conclusion that one of the important factors upon which the taste of butter depends is the presence, in considerable quantity, of those peculiar fats which yield volatile fatty acids, and this conclusion is greatly strengthened by the fact that it is the presence of these same fats that distinguishes butter from other animal and vegetable fats and oils belonging to the dietary of man.

The great majority of creameries are amply protected from an excessive supply of milk from strippers because they depend upon dairies that keep up their milk supply throughout the entire year, and for this reason it is extremely rare to find upon the market of our State, butter having a very low Reichert-Wollny Number, but there are sections in which entire herds of cows are fresh in the spring and go dry in the winter, and there is therefore a possibility of such butters being found upon our markets. If such a butter were subjected to chemical analysis the abnormal Reichert-Wollny Number would at once excite the suspicion of adulteration.

At least three other causes can be given which exert a marked influence upon the quality of the butter. There are, first, the food of the cows, second the length of time and the temperature at which the cream is allowed to ripen, and third, the character of the fermentation which takes place in the ripening cream. The food of the cows exerts a marked influence upon all three of the most important characteristics of the butter, color, consistency and flavor, but under normal conditions when cows are properly fed the flavor of the butter will depend upon the degree of ripening of the cream, the amount of acidity allowed to develop, and upon the character of the changes allowed to take place in the cream during this process.

This entire subject of the proper treatment of the milk for butter making belongs to the comparatively new science of bacteriology, and forms a very important part of the curriculum in every institution of learning where dairying is taught. Today, in nearly every creamery in the country, the ripening of the cream is carefully and intelligently controlled, for it is a matter of common knowledge that the flavor of the butter depends upon the control of this process.

In the process of butter making as I knew it more than forty years ago very little attention was given to the ripening of the cream, and consequently a large proportion of the butter produced was of very inferior quality. The science of bacteriology had no existence at that time, and little was known of the chemistry of dairy products. The knowledge of the experienced butter makers was limited to isolated facts of their own observation, or received from the preceding generation. The facts they did possess were in many cases

attributed to wrong causes. Fortunately, many a housewife of the past generation appreciated the value of cleanliness, and the importance of keeping the milk cool. Their lack of theoretical knowledge was in part offset by an extended practical experience begun early in life, and as a consequence butter of excellent quality was not unknown. At the present time, however, in those sections of the country where butter making is still carried on in the manner I have described, the product usually finds its way to one of the so-called creameries, or renovating factories, before it is offered for sale.

FEEDING AND MANAGEMENT OF DAIRY COWS.

By Prof. H. E. Van Norman, State College, Pa., Before Annual Normal Institute, State Board of Agriculture, Towanda, Pa.

Mr. Chairman, Ladies and Gentlemen: There has recently come into use a new phrase, and the thought and the wish has come into my mind, that this phrase might be applied in a different way. The phrase is, "Farming with Dynamite." I consider it one of the most sensible things that can be applied to the farm to-day, and I wish that the firm that has dynamite to sell would find some way to apply it to the farmer, as well. I believe that the best thing that could be done would be to give our farmers a charge of dynamite strong enough to lift them out of the rut in which they are.

This session is composed of representative Institute Lecturers of Pennsylvania, and Chairman of the County Institutes. This is not supposed to be an average audience, and I fear that sometimes we forget that fact. We are the exception, or else we have no business being here. You are the men who are the leaders in your counties, and you are the men who are going out to help the leaders in your respective counties raise the average man there up a little bit. Now, the last speaker is not an average apple grower on an average farm. He is an exceptional farmer and the exceptional apple grower, and I wish that somehow we could plant in the minds of our speakers the necessity to emphasize the thought that in order to get out of his rut, a man must do something more than the average man. Why is it that the last speaker could go out and compete with the Western apple grower? Because he did not sit down in a rut. The Western men got out the rut, and they can send their apples right in here, where we can produce them cheaper than they can, and we have to compete with them, and can't do it with the average man.

Now, to get down to my subject. I have no patience with the man who tries to run a successful dairy with the average cow. To be successful, he must get rid of that average cow, and get out of his rut. We got some figures from the patrons of our creamery at State College, of which there are one one hundred and eighty at the present time, and we found these conditions, viz: That on one farm there were fifteen cows kept; four of them did not pay for themselves, and the other eleven made a margin of two hundred dollars. Now, then, these four cows brought down the average. If they could be disposed of the other eleven would show a larger profit.

There is one thought that I want to impress very strongly, if I can, in regard to the management of a dairy farm, and that is, that in order to increase our profits, we need not look to our sale price, but we can do it ourselves on the farm.

Now, the man who is keeping eleven to fifteen cows and shipping his milk into New York might just as well look into this, because he cannot change his price. That price is regulated by the great law of supply and demand, and I don't believe the price is going to change very quickly; whether it is within the next sixty days, or within the next two years, the man who produces milk will have to take the price that is fixed by the great law of supply and demand. So we will eliminate that and take up the next proposition.

The first thing we must do is to eliminate that unprofitable cow and get rid of her very quickly. Why is it that every farm in this county is feeding two or three cows, not one of which pays for her keep? Simply because they are in a rut, and all the College can do, and the Farmers' Institutes can do, and all the State Board can do, and all the railroad can do, all the other agencies can do, is to apply a little bit of dynamite and jolt them out of their rut. Not even the Legislature can legislate profits into the pockets of the average man. All we can do is to show him how to get it.

Now, after we have eliminated the cow that is unprofitable, what shall we do with the others? I will confine myself to the feeding problem. I will also eliminate the fact of the high price of feed; that is something we cannot control. What can we do? The first thing we can do is to quit feeding that high priced stuff to the cow that does not pay for it. The next is, that the cow must eat three hundred and sixty-five days in the year and we must feed her something that is worth money. If the feed does not do it, we should add the profit in some other way. We sometimes forget the value of our pasture. We have it, and it must be made to produce some profit. Your cow should be made to produce a profit for every acre that she eats what grows on it.

The next thing is that she must not only be made to pay for her maintenance and her management, but she must pay for what it costs to produce her milk. Therefore the amount of milk produced in one year is a very important feature in the feed of that cow. I am not a very good chalk artist, but I believe some things sink in better through the eye, than through the ears. We have a dollar's worth of milk, and feed her ninety-nine cents' worth of feed: where is the profit? If we were to feed that cow a dollar's worth of feed, and get two dollars' worth of milk, there is some hope of getting a little real profit in it. The first thing to do is to know what we are doing. When we come to the feeding point, there are two things that enter in: the first is the ability of the cow to consume feed, and then to supply her with what she needs, not only in quantity, but in kind. Our Experiment Stations have been telling us for the last thirty years about "balanced rations," but it is only for the last five years that it seems to have come down to a practical working basis, and out of it has come the proportions I am giving you this morning. The man who keeps cows may fail to balance his rations, and still show a profit, but it is possible to make a mixture of feeds and feed it to the cow in proportion to her grain feed so as to give her the variety she wants, and be reasonably sure she has enough to give her ability to make milk and take care of herself. The first thing we want to remember is that she must have enough milk; the next thing is that in making up her mixture, we do not simply make a grain mixture.

Now we want to reduce it to figures, and we can do this according to the law of digestible nutrition, and it can be done according to our new standard. The cow must get enough protein, and, second, she must get enough energy to meet her requirements for maintenance and milk production. To many of you the term "energy," I think is new. The best definition of energy is a very short one: "Energy is power to do work." You can measure oats in a quart measure; you can measure oats on the scales; you can measure oats in terms of digestible nutrition. You can also measure these oats in terms of energy—the work they will do. You can put these oats into the furnace and burn them, and they will turn that energy into heat; we can put them into the engine, and they will produce steam; you can put them into the silo, and turn their energy into power, but power comes from the oats. Every feed we have can be measured thus, in the terms of its power to do work. Now you have the explanation. Lay it aside for a moment and, remember that there are only two things we are going to do—try to furnish that cow enough power to take care of

herself and to make her milk, and be sure that we remember that the energy comes from protein. You can get enough energy from sawdust, but you cannot get the cow to use it. She must have protein.

A thousand-pound cow requires five-tenths of a pound of protein and six therms of net energy every day, three hundred and sixty-five days in the year. The therm is the unit of measurement, just like a quart of oats, or a gallon of milk. If you want to know more about it, write for the Bulletin on "Computing Dairy Rations." If this cow is going to make twenty pounds of milk that will test 4% fat, it will require one more pound of protein and six therms of energy more or she will require a total of one and a half pounds of protein and twelve therms of energy per day. Now, if that cow has the ability to make twenty pounds of milk, and you only give her a pound of protein and eight therms of energy, there are just two things that can happen: If she is fat, she will rob her body and put it into the pail; if she is a dairy cow, or if she is not fat, she will not put it in the pail. And whenever you find that the cows are not putting it in the pail, if they are dairy cows, they are not given enough to do it with, because Nature has so fixed them that they will take care of themselves first.

Now, if she is to make forty pounds of milk, she will require another six therms, and another pound of protein. In other words, the more milk the cow makes, the cheaper she makes it, because she only has to take care of herself once. Some of our farmers do not think of that. They only think of the amount of food they use, and of the profit. We should think of the returns we are getting.

I wonder whether I have made this plain—that every cow should be fed to the limit of her ability to use it above maintenance. It does not cost more to maintain a twenty-thousand pound cow than any other because the cost of maintenance is practically the same.

How shall we feed our cow, so as to be sure to give her what she needs? Let us use a few figures: A 1000-lb. cow requires 5 lbs. protein and 6 therms for maintenance; if she is to produce 20 lbs. of milk, we must add one pound protein and six more therms of energy, making a total of 1.5 lbs. protein and 12 therms of energy for the production of twenty pounds of milk, and for maintenance. I would suggest this rule: feed one pound of grain to every three pounds of milk. Now, that is not the only rule, but it is a safe rule. You can give it to your ignorant farm hand, and if he follows it, you may be sure that there is no danger to your herd; or you can give it to your brilliant son, or to the college man, and your cows will be safe. According to that rule, the cow that produces twenty pounds of milk a day will require about seven pounds of grain, because thr

into twenty is near enough seven to be called seven. Seven pounds of grain furnish about four therms of energy. Having given her the seven pounds of grain, give her all the roughage—good hay or silo or corn stover—that she will eat up clean, and she will get the other eight therms. By “grain” I mean any of the mixed feeds—corn meal, cotton seed meal—any of the mixed grain feeds. Grass I should count as roughage. Having, then, given her all the roughage she will eat, she has all the energy she needs, The roughage that furnishes this energy also furnishes a little protein, viz: About a half pound. Now, then, we can make our grain mixture so that it will furnish the other pound. We can make up a grain mixture that every time it furnishes four therms of energy, will furnish a pound of protein; that will be a 1-4 mixture. Give the cow three quotas of it, and all the roughage she will eat, and she is all right.

But the question comes up that I am feeding timothy hay and the other fellow is feeding alfalfa. Then our mixture will have to be made in accordance with the amount of protein necessary to make up the amount required to produce our quota of milk. For instance, we can use a 1-8 grain mixture. I don't want to confuse you by giving you a whole lot of figures. I simply want to give you the principles, and then you can send for the bulletin and think it over.

We have fed our cow seven pounds of grain, because she is giving twenty pounds of milk. That contains about four pounds of energy; the other eight will come from the roughage; that is the 1-4 mixture.

Has any one any questions up to this?

MR. L. ALDUS HERR: This twenty pounds of milk you are producing, what does it cost to feed? Suppose you use a mixture of silage, cotton seed meal, corn stover and corn once a day?

PROF. VAN NORMAN: I am not a lightning calculator; I will let some one else figure that out.

MR. J. ALDUS HERR: I can't answer that myself; but isn't it possible that a good dairy cow can consume more carbo-hydrates than one of the beef type? I have a beef cow that I must give corn once a day to keep her in flesh.

PROF. VAN NORMAN: You are a sensible man; you are one of a body of men that are beyond the average; you know your cows. Now, so far as our experiments show, there is not nearly so much difference between cows as most people think. There is some difference, but not as much as people think. You look after your own feeding?

MR. J. ALDUS HERR: Yes, sir.

PROF. VAN NORMAN: And have you a man you could trust to do the feeding if you were away for six months?

MR. J. ALDUS HERR: No, sir.

PROF. VAN NORMAN: Well, that is the point. If you have this rule you can go away, and be sure that you will have at least nearly as good results as if you were there yourself.

MR. J. ALDUS HERR: Now, we use more carbo-hydrates. We grow corn in our county, and we find it cheaper to feed considerable of it because we know we get better results.

PROF. VAN NORMAN: There are a lot of factors that enter into the question, and which depend upon the individual. I cannot give you any hard and fast rule. Two men will take a pair of horses, and one of them will load up the wagon, and he cannot get started because one of the horses holds back. The other man gets on and takes the reins and starts off without any trouble. Now, that is not the horse; that is the man. So it is always the man behind the gun; but it is safe for the average man to have a rule, and if he cannot use it he is hopeless. This way we have no weighing out to do; we simply put it on the barn floor and mix it in the proper proportions, and there we have the 1-4 mixture.

The relation of protein and energy will depend upon the roughage we have. If our roughage is timothy hay and corn stover and silage, or any two of these, then we want to make up a grain mixture about 1-4½. If we have a good supply of clover hay with the timothy and silage, then about 1-5 is enough protein. If we have the clover hay, then about 1 to 7 or 8; so that our roughage shall determine the amount of grain our mixture shall carry. I have followed this rule, generally. Here is a mixture of 1-5. I simply give it because I have the figures here:

	Protein.	Therms energy.
400 lbs. cornmeal,	28	252
100 lbs cottonseed meal,	35	34
300 lbs. distillers' dried grains,	68	237
100 lbs. gluten feed,	20	71
	149	744

Now, if you will divide 149 into 744 you will find that the result is practically 5; in other words, here you have your 1-5 mixture. If you want a 1-4 mixture, you can use more cottonseed meal or corn and cob meal both of which are low in protein, and high in energy. Suppose you want a 2-4 mixture, take out half of the corn meal.

MR. McCALLUM: Professor, is there a possibility that there may be an excess of protein?

PROF. VAN NORMAN: Protein will perform the same functions to err on the side of a little too much rather than a little too little.

MR. KESTER: Can you deduct it from one and add it in with some of the others, as we shifted with the carbo-hydrates?

PROF. VAN NORMAN: Protein will perform the same functions as the carbo-hydrates, but we cannot make anything take the place of the protein. Mud will take the place of the brick, but the brick will not take the place of the mud. The difference between carbo-hydrates and energy is that carbo-hydrates is something, and energy is what that something will do, so we want a mixture of feed so balanced that they will produce sufficient energy to do it properly. Dr. Armsby in his calymeter has shown that they mature more rapidly if we do this. We do not figure in decimals because you cannot prove to me that your timothy is exactly the same as I feed, or that your cottonseed meal is infallible in this respect; so we use only the whole numbers, which is close enough for all practical purposes.

MR. J. ALDUS HERR: The only objection I have to that ration is that three of those feeds I cannot grow; I must buy them.

PROF. VAN NORMAN: That is getting off a little bit, but I think it is one of the points that should be considered. If I can buy a hundred dollars' worth of feed and get a hundred and twenty-five dollars back, that twenty-five dollars is profit. Or if I can even get a hundred and five dollars for it, the five dollars is profit. Profit is the only element that enters into it. If you can grow something on a hundred acres that you can sell to better advantage and buy your feed, the only element then is what you can buy to feed at a profit. I think a whole lot of men make a mistake in thinking they can consume what they grow at a greater profit than they can buy feed for and feed it. There is no horizontal rule in this any more than the silage and roughage your cows will eat and then buy the grain feeds, I believe you will be doing business at a better profit.

MR. FENSTERMAKER: Why not grow alfalfa?

PROF. VAN NORMAN: That is very good; I am simply speaking in general terms.

MR. J. ALDUS HERR: If I don't use what I grow on the farm, there comes the expense of hauling it away, which means labor. And where am I to get a market for my corn and my fodder and my hay, that I grow on my farm, if I buy the high-priced feeds instead of feeding what I grow?

PROF. VAN NORMAN: Use it.

MR. J. ALDUS HERR: I can't; we grow too much.

PROF. VAN NORMAN: Then keep more cows.

MR. J. ALDUS HERR: Can't; we have reached our limit.

PROF. VAN NORMAN: Here we have one of the factors on which the individual has to work. If you have a small farm, or if you have a large farm, and grow more than you can use, then produce your own protein. There comes in your old-time principle that is so often preached—don't buy your high-priced feeds. I say buy them if necessary to feed at a profit.

A MEMBER: Early in your remarks you advised feeding the dairy cow to the limit of her capacity; what is the capacity of a dairy cow; and, second, is there any danger in cottonseed meal?

PROF. VAN NORMAN: I mean in regard to her health, and to the limit of her health. When she begins to store it on her body, she is beginning to exceed her ability, and she loses in production. Some cows seem to have no limit; you can never give them enough.

A MEMBER: Then you had better sell them for beef.

PROF. VAN NORMAN: That depends; if it is more profitable to sell her for beef, then sell her for beef.

But you must take care of her during her trying time. You never see a fresh cow that is not thin during the first two weeks. She is drawing on her energy, and should be fed accordingly.

Cottonseed meal at the price of the last few years, is one of the cheapest feeds you can buy. If you make a mixture of three or four different kinds of grain, you will never have to use much cottonseed meal. Don't feed any one cow over four or five pounds, no matter what she does. There are some men who will feed six or seven pounds.

Cottonseed meal contains some objectionable product which is deleterious in some cases, but you rarely find trouble with it, so that it is considered practically safe.

MR. YOUNG: Is it possible to make a mixture of three of these ingredients that will do almost as well?

PROF. VAN NORMAN: Yes; but care should be taken to have it, as well as every other ration, palatable. Distillers' grains are light and bulky; the gluten feeds also furnish bulk. You might use wheat bran or wheat middlings and make a balanced ration, but your cows will not like it as well. However, I am talking now to the men who are going out to teach the farmers, and I want to give them a mixture that is as nearly fool-proof as possible. The 1-4 mixture is both safe and palatable to your cow.

MR. YOUNG: These feeds we must buy, and we must buy them in carloads. Still the small farmer cannot use a carload and he must get assistance from his neighbors to buy that carload. Now, if he must buy the gluten feeds and the distillers' grains, he must buy two carloads, but if he can substitute something else for one of them, he needs buy only one carload.

PROF. VAN NORMAN: Where is your State Grange, and Cow Testing Association? Why don't these organizations get together and take up these things? I want to say right here that in any community, if five or six fellows get together and go to the feed dealer and say to him "we will take five carloads and unload them at the station if you will reduce your profits," he will have no trouble in getting a reasonable price. I have known feed dealers to take a dollar and a half a ton under these conditions, where ordinarily they want three or four dollars.

A MEMBER: Where a man is not a dairy farmer, but keeps only three cows, is it possible to raise our own feeds cheaper than we can buy them?

PROF. VAN NORMAN: I believe it is, but I don't believe in this half way business. I would only have one cow to furnish feed to or I would go into the business in the right way. These fellows with five or six cows don't take proper care of them.

A MEMBER: Corn and cob meal and buckwheat help out on the grains, and they help out on the hay.

PROF. VAN NORMAN: That is a practical matter which applies largely to the individual. What is corn worth a hundred?

A MEMBER: \$1.75.

PROF. VAN NORMAN: Now, if we buy a hundred pounds of corn meal at \$1.75—

MR. COWAN: Where can you buy that?

PROF. VAN NORMAN: I don't know.

MR. COWAN: Neither do I.

PROF. VAN NORMAN: That is something you will have to work out for yourselves. I am simply using this as a basis from which to teach you fellows to figure. If you buy a hundred pounds of corn meal at \$1.75, you have your seven pounds of protein at the rate of—one pound would be one-seventh of that, or 25 cts. At that rate your protein costs you say \$25.00 per hundred in corn; this supplies us 88 therms of energy at a practical cost of 2 cents (1-88 of \$1.75) a therm or \$2.00 per hundred. Now let us take cottonseed meal. What is that worth?

A MEMBER: \$1.65.

MR. COWAN: \$1.90.

PROF. VAN NORMAN: All right; \$1.90, then. At \$1.90 cottonseed meal will furnish, say 35 pounds of protein, at 5 cents plus, or \$5.00 for protein. The energy in a hundred pounds of cottonseed meal is 84 therms, or a little over 2 cents a therm. The energy in cottonseed meal is just a trifle more expensive than the energy in corn—\$2.00 plus.

A MEMBER: At \$1.60 or \$1.70 it would be about the same.

PROF. VAN NORMAN: Yes, sir. The thing to do is to figure the cost of your feeds in this way, and then determine for yourselves which is the cheapest for you to buy, and then select the ones that furnish energy the cheapest. Usually it is corn, or corn and cob meal. Take them; what are they worth?

A MEMBER: 75 cents.

PROF. VAN NORMAN: For \$2.20 in oats we get eight pounds of protein—about 27 cents a pound or \$27.00 a hundred. That is not quite right; yet we feed them just because we raise them on the farm. Now, we figured out this week in our class that the man who had a hundred bushels of oats which he could sell at 50 cents and haul them into town and allowed him \$2.00 for going into town and \$2.00 for going back again, could buy the same amount of energy in cottonseed meal and save fourteen dollars in cash and have eighty pounds more protein. Now I want to emphasize two things: first, what are you getting for what you sell, and next, what does it cost you for what you put back—the same amount, or more? As a rule,

at the price of oats in this State, we can better sell them and buy some other feeds. Now, there may be conditions where a man may be justified in holding them. He may have to hire labor, which is expensive. Now, what are buckwheat middlings worth?

A MEMBER: White buckwheat middlings from \$23 to \$25 per ton. But the cow does not care for it because it is sticky.

PROF. VAN NORMAN: Mix it with something else.

MR. COWAN: Wheat bran or corn?

PROF. VAN NORMAN: No wheat bran for me at \$27.00 a ton.

A MEMBER: One member said he raised all his concentrates except bran. Why not raise that?

PROF. VAN NORMAN: Because there is a screw loose somewhere. Now, I want to review a little bit: The first thing is to feed for maintenance; but the cow is not profitable unless she produces enough for maintenance and milk, so the next thing is to feed for profit and this can be done by a mixture that is sufficiently cheap, and light and bulky, feeding, as a rule, one pound of grain for each three of milk; or, it may be, one pound of grain for each four of milk; or, even, under some conditions, one pound of grain for each two and a half pounds of milk. Now, this is the rule which can be safely followed and it applies to the cow which produces twenty pounds a day, or sixty pounds a day. But now comes the question. How much to give her when she is not in milk? Well, she can live on roughage, if necessary; it is not advisable, but she won't starve to death. Then the next point is to find out at what price the different feeds furnish protein, and use that as a basis for your ration, making a mixture of different feeds for variety. A feed that is too constipating must be avoided and something more laxative substituted. The relation of protein to the energy in that mixture will be determined by the roughage. For timothy hay and corn and bran you will have to use more protein than when you feed clover hay or alfalfa. I believe you can figure out very easily. If not, organize a "Cow Cost Club" and hire a bookkeeper to figure it out for you. Carnegie does that, you know, and he would not do it unless it was the best thing to do.

MR. FENSTERMAKER: How about oil meal? Is it too high?

PROF. VAN NORMAN: Well, at the price of oil meal this winter, I would not use it. It is a laxative but you can get your protein cheaper.

MR. BIDDLE: At the high price of the oil meal this past winter, would not sorghum be a good substitute?

PROF. VAN NORMAN: It is thought to be so, but I would not speak as positively as I would on some other subjects.

MR. GOODERHAM: Up in Cambria, some of the people who were feeding cottonseed meal lost their cows and attributed it to the cottonseed meal. Those who lost their cows had put little troughs up and let them eat as they wished. Others mixed it thoroughly with feeds and had no trouble. Might this manner of feeding have anything to do with it?

PROF. VAN NORMAN: I don't know. I would not feed over six pounds of cottonseed meal a day under any circumstances, but I have known men to feed as high as twenty.

MR. FENSTERMAKER: Does that include the hulls?

PROF. VAN NORMAN: Sometimes it does, sometimes not. I think a good standard here is about three to four pounds.

MR. GOODERHAM: Mix it with silo?

PROF. VAN NORMAN: It doesn't matter. At the price of hay this last year, the grain feeds have furnished protein cheaper than the hay, and under those conditions it is a good plan to feed as much grain as possible, and as little hay. If you will send for Bulletin No. 114, you will be able to get a little more information on this subject.

ESSENTIALS OF BUTTER MAKING.

By Mrs. Jean Kane Foulke, Division Farm Advisers, Department of Agriculture, West Chester, Pa.

Before Annual Normal Institute, State Board of Agriculture, Lancaster, Pa.

I feel as if I were undertaking a great deal in attempting to tell an audience of farmers how to make butter, because I am not what is termed an "expert" myself; that is to say, I am not a trained butter maker, never having taken a course in butter making in any agricultural school, or indeed in any school save that of experience. However, as you all know, experience is credited with being a good teacher, if a hard one, and it is possible, therefore, that mine may have taught me some lessons that may be of use to some of you.

To make good butter is not such a simple matter as it appears, and it demands a care and attention that is seldom given to it. This fact accounts for the amount of bad butter that you see sold and used, and is one reason why oleomargarine and other patent butter is in such demand. They not only are cheaper or as cheap, but they run more evenly good, keep better and taste better.

The first essential for good butter is to have good rich milk and clean milk, milk that is free from any extraneous flavor such as may be absorbed from the atmosphere, feeds or plain dirt. To get this, care must be taken as to the kind of feed used, especially if the milk is for butter. Milk that tastes all right and is all right for other purposes, when used for butter will not do at all. One can often distinguish the different tastes of feeds in the butter, and any radical change in the feeding may at once be detected. A little too much silage will spoil butter, and in cases where several cows' milk or the produce of the whole dairy is used, a knowledge of what each cow is getting, the amount, etc., should be carefully watched and known, and the effect upon her milk noted. This should be done in every dairy, as a matter of fact, as it is only thus that the feeding can be profitably done. Many cows do not need, and others do not digest, the kind of food and the amount of it that their fellows in the same stable should have. It is this knowledge of the individual that is a most important feature in any sort of dairying, and it is essential in a butter herd as a cow's milk is affected by her condition and this quickly affects the butter.

Having made sure that there is no taste in the milk from the feed that will show in the butter, the next thing is to be sure that the milk is cleanly drawn—that the milker has clean, dry hands, that the cow's sides and udder have been brushed and freed from manure and dust, loose hairs, etc., and that the milk is taken as soon as possible from the stable to prevent the contamination from the unavoidable odors and dust of a cow barn or milking shed. Care should be taken that the cans and pans are not exposed to road dust and manure and that they are scalded and washed thoroughly clean.

The milk is now ready for the dairy, and it depends very much upon whether it is to be separated or hand-skimmed what is to be immediately done with it; but as I am speaking of profitable butter making I assume that it is to be separated. In my opinion, milk for butter making should never be thoroughly cold. It should be cool, but never thoroughly chilled. In the dairy of which I have charge the milk is separated at a temperature of about 75 to 80 degrees. It is necessary to hold it over night, as we separate but once a day, so that the evening's milk is set in coolers or cans in the spring. These coolers hold about 12 quarts, a convenient size to lift.

Our spring water keeps about 56 degrees. I have a coal stove in the spring or dairy proper and keep a low fire all winter, keeping the temperature about 60 degrees and we try not to have it vary more than a degree or two one way or the other, and are very careful about ventilation and to prevent coal gas, dust, etc. Men are not allowed to enter the dairy in their working shoes nor is smoking allowed there. Care must also be taken after white washing. This dairy is an old fashioned spring house and has been made over somewhat to suit modern methods and increased trade. Of course it would be better if it could be heated by pipes and thus do away with the stove, which in this case necessitates covering the cream each time it is raked and the ashes removed, and great care in seeing that there is no coal gas which would affect the cream at once.

The cream should be stirred down every day and thoroughly mixed. To do this I have a round disk of tin, with a row of inch holes, fastened on a steel rod about two and a half feet long, about like a poker. This disk or tin plate is just large enough to fit inside the coolers and be moved up and down, allowing the cream to come through the holes and thus becoming thoroughly mixed. Cream should not be allowed to fall far from the separator to the can, as the air in the froth on it seems to make it rancid very soon and stirring down into the can ruins the whole can of cream.

Ripe cream is sweet cream soured. Soured cream has a pleasant smell and is not rancid or strong. It tastes good and is pleasant to eat. I know of no better dessert than a saucer of soured cream and a slice of soft ginger bread, and can think of nothing worse than to have to eat a saucer of sour cream even if accompanied by "angels' food."

Sour cream is cream that is spoiling and on the way to putrefaction, but soured cream or what is called ripe cream is luscious and sweet. It has reached a point of fermentation where it is still fresh and unspoiled, and has not yet begun to decay. To bring cream to this state at the time desired is a delicate matter. In my own case I have the coolers lifted out of the spring and stood on the cement floor, and into each one I put a little more than one-half pint of souring from twenty-four to thirty-six hours before churning. This in an atmosphere with a temperature of 60 degrees will ripen the cream sufficiently for butter making, although if the dairy temperature is lower it may take longer.

The souring is made fresh each butter day—we churn twice a week, each Monday and Thursday—by taking six quarts of separator skim milk and adding two quarts of fresh buttermilk, which is well mixed and kept stirring each day, the top being taken off before being used for souring.

The public demands butter of a good rich color, but except in Summer, and not always then, do even Jerseys give cream that will make yellow butter. Therefore the butter maker must resort to some of the many kinds of butter coloring that are on the market and are sold under the pure food laws. I have used "anato," which is a South American gum or root which comes in a powder very finely ground, a purely vegetable compound and entirely harmless. I know of but one place where it may be had and that is at Hansell's, No. 8 S. 18th Street, Philadelphia. I used to buy it by the pound but now it must be bought in five pound packages. It should be kept in a dry place. Preserve jars make good tight receptacles for it, and by opening one jar at a time the balance may be kept safely. I use at this season of the year and through the winter one tablespoonful to seven coolers of cream, mixing it first in about one quart of luke-warm water, and then stir it in the cream with the mixer described before.

The cream is now ready for the churn and to get the churn ready for the cream is the next step. I want to say here that scalding water, and plenty of it is a necessity to successful dairy work, and if one can have steam also it facilitates the work of cleaning and sweetening the dairy utensils, churn, separator, etc., enormously. The churn should be thoroughly scalded and rinsed, then chilled with plenty of fresh, cold water, after which it is ready for the cream, and we may begin churning. In this cleaning work use no soda and no soap except possibly to wash the rubber rings of the separator.

It should require about half an hour for the butter to come and as soon as you have butter the size of shad roe or very small marbles it is time to stop churning. After that to continue churning merely injures the texture of the butter. You get no more out of the cream but merely gather it into large greasy lumps.

Draw off the butter milk through a wire seive to catch the butter that will flow out of it. Then rinse the butter with cool not cold water and take it from the churn.

While the churning is being done, one should have scalded all the paddles, print, etc., to be used, also the butter worker, and should have chilled them afterward and left them in cold water. We set ours in the spring to await our needs.

The butter is put on the worker and the salt is spread over it. We allow half an ounce to the pound, and it should be weighed, not guessed at, unless you have buckets to hold the butter and measures for the salt that have been tested, so that you know what you are doing.

A sponge with a bit of cheese cloth about it makes a very useful thing in working butter. One should stand sideways to the worker with a sponge in one hand the paddle in the other, and keep turning the butter up and over to the worker, and keep constantly patting it with the sponge, thus absorbing the water more quickly and lessening the danger of destroying the grain by over-working to get dry. The water and the salt should, however, be well worked out, not only the experience can tell one when this is sufficiently done; but there is a look that means a little to the experienced butter maker that the butter is worked.

In butter, as in everything else that we want to sell, appearance counts for much and care should be taken to have the prints sharp and well cut, so that the butter may take the impression clearly, after which it should be neatly wrapped in butter paper and set in pans to harden. In Summer the butter is often too soft, when first printed to wrap and should be laid on open papers in the pans and wrapped later. The triangular point of paper at each end of the package should be turned under, rather than upwards, in wrapping as it makes a neater package. Some persons have naturally cool hands and these are fortunate if they must handle and wrap butter. For myself, I have a warm hand and so must be continually dipping my hands and arms to the elbow in cold water to keep my fingers cool and dexterous.

Too much care cannot be given to the cleaning up after butter making, for much of the success of the next butter depends upon the sweetness of the utensils used; and especially when they are wood is it necessary to scald and scrub and steam them, clean, chemically clean, so that no animal fat may enter the grain to decay and thus destroy the possibility of making good butter or keeping the dairy tools sweet. It is impossible to get them thoroughly clean if once the grain gets full of rancid fat and grease.

The dairy should be light and cool and well ventilated; not a dark, damp little cave as many of them are. It is impossible to make good butter without clean, sweet milk and cream, and clean, sweet surroundings; and it is this cleanliness and sweetness that makes the charm of the churn and that are the essentials of butter making.

THE CHAIRMAN: The paper is open for discussion if any person wishes to ask questions.

DR. CONRAD: About what percentage of fat is that cream, heavy or light?

MRS. FOULKE: Very heavy.

DR. CONRAD: I suppose 40 or 50?

MRS. FOULKE: Yes, sir. I made a few notes here that I thought would be interesting. I kept very careful account in connection with the dairy and I thought possibly they might interest some of you gentlemen as well as the ladies. In the dairy that I run we have milked 28 cows. They are grade Jerseys, most of them. We have a 13 horse-power boiler and 5 horse-power engine. That engine runs the separator and churn and butter worker and the pump that pumps the water to the mansion house. We have a 60 lb. Embree butter worker, cylindrical churn with perforated paddles.

Now I have been feeding 28 head 35 lbs. of ensilage, 1 lb. cottonseed meal and 10 lbs. of grain, 5 lbs. of Sugarine Dairy Feed and Holstein Grains; then about 8 lbs. of hay in the middle of the day. In January, 1911, we produced 711½ lbs. of butter; in February, 621½ lbs; March, 862 lbs.; April, 895 lbs. Of course, that was taking the dairy, some dry, some fresh and some just milking along. I struck an average for the year, from April 1st, 1910, to April 1st, 1911. I could not give the amount exactly of hay and straw used, neither could I give the account exactly of the cost of raising the corn for ensilage, but I did count the time taken to cut the corn and filling the silo and I took the wages of the two highest priced men on the place who have to do with the dairy and all the cost of bought feeds; also I counted the by-products of the place which I regard as very valuable in connection with the dairy. I bought some and sold some; and added on that, and I find that in the year from April 1st to April 1st we had made a net profit with those things taken out, of \$2,115.13.

A MEMBER: When do you feed?

MRS. FOULKE: I have had the feed put in when the cows are put in.

A MEMBER: Before milking?

MRS. FOULKE: The feed was put out for the cows, of course in the winter when the cows are in the dairy. Now they are turned out and the feed is put in the troughs for them and they come in at supper. They get the ensilage after they are milked, just afterwards. I put the grains in and they get the ensilage afterwards.

A MEMBER: How long do you leave the butter stand after you have it printed?

MRS. FOULKE: I put it right away as soon as I can do it. Yesterday we made enough butter to have to work three different workings and went right to work as soon as we could. I have pieces of muslin cloth and we keep the butter in that after it comes off the worker and then we work it just as fast as we can.

A MEMBER: Have you had any experience in working the butter in the churn?

MRS. FOULKE: No, we do not do that.

A MEMBER: I understand your barrel churns roll?

MRS. FOULKE: Yes, roll round.

A MEMBER: This is round?

MRS. FOULKE: Yes.

MR. BARNES: Did I understand you to say that you held the milk over from evening to morning?

MRS. FOULKE: Yes, we hold the milk over from evening to morning.

MR. BARNES: Do you find that more profitable than while the animal heat is in the whole of it?

MRS. FOULKE: I have been doing it because if you want to start up the machines, if you have a boiler it takes considerable fire.

MR. BARNES: In our case we use a gasoline engine?

MRS. FOULKE: I don't know whether you are lucky or not.

MR. BARNES: We separate twice a day.

MR. RODGERS: At what temperature do you separate the milk?

MRS. FOULKE: 75 degrees.

MR. KERRICK: How about your ensilage material?

MRS. FOULKE: I leave it go until the leaves begin to turn and it is about time to mature and then it comes in with the rest of the farm work. That is, I think the more corn it has in it the better it is. The best ensilage I had I made from millet. I had a little millet. We thought we would be short of hay and we planted millet; then the hay came on; and I cut it just as the seed was becoming round. We cut it the way you cut oats and we put it in the silo and we didn't empty the silo for three years and it was as good at the end of three years as when it went in.

A MEMBER: Would your butter stand up better than creamery butter?

MRS. FOULKE: Better. I sell it in West Chester to a very careful community. They are most of them Friends and they know when they spend money, and several people have said to me that one pound of my butter would go as far as one and one-quarter pounds of creamery butter or other butter.

A MEMBER: What price do you get?

MRS. FOULKE: I would not take less than fifty cents just at West Chester, and for some butter I get seventy-five cents.

MR. CLARK: There is an agitation all over the country—there is a law—I do not know whether it will pass this week—that you have got to sell full weight now.

MRS. FOULKE: I do that.

MR. CLARK: Suppose you put up a pound print, how long will it remain a pound brick?

MRS. FOULKE: My butter is so good that people eat it before it has time to shrink.

MR. CLARK: The Elgin people supply nearly all of the butter in the western part of the State and when it goes into the market to the consumer it weighs but a fraction over fourteen ounces, never very much more than a fraction over fourteen ounces. What is that fellow going to do?

MRS. FOULKE: I would try not to buy that butter.

MR. CLARK: They say they put up pounds. What is the reason for the loss?

MRS. FOULKE: I think they put it up all right but they put a lot of water up with it and water will evaporate. Butter well worked will stand up.

MR. CLARK: It will not lose that much?

MRS. FOULKE: It will not lose at all.

MR. CLARK: These fellows are in Harrisburg lobbying now?

MRS. FOULKE: Oh, well, I can't vote.

A MEMBER: What percentage of moisture is there in butter after it is worked?

MRS. FOULKE: Not any at all. I work mine as dry as I can get it.

A MEMBER: What is the average income on each cow? You say you had 28 cows?

MRS. FOULKE: I do not think I could tell you that. If I had known that you were going to ask me that question I could have answered.

A MEMBER: How many acres of land do you have?

MRS. FOULKE: The two farms that I have charge of make about 150 acres; and I also rent a great deal of extra land from neighbors or else buy the crop. Last year I had between thirty and forty extra acres costing about \$76.00.

A MEMBER: Do you pasture your cattle?

MRS. FOULKE: Last year I did.

A MEMBER: Did you ever run over a year that you did not pasture?

MRS FOULKE: No, I never tried that.

MR. DEWITT: I wish to make a little statement. We have up in our country a condenser near Mansfield, Tioga County. A man coming from the vicinity of the condenser has ten cows; just cows not only fancy breed but good looking cows. I saw the cows. He patronizes that condenser. His cows brought him in \$96 a year without any of this extra trouble, a piece.

MRS. FOULKE: \$76.00 a year over and above the cost of food and labor would be the average for each of my cows.

A MEMBER: You did not figure out all the feed.

MRS. FOULKE: Total profit of \$2,115 on 28 cows would be just about \$76.00 a piece profit after the labor and feed were paid for. The only thing I did not account for was the hay and the corn in the ensilage; but against that I left the heifers, I left 15 heifers; and the manure certainly ought to cover the hay.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF AGRICULTURE

BULLETIN No. 269



TABULATED ANALYSES OF
Commercial Fertilizers

FROM SAMPLES SELECTED IN ACCORDANCE
WITH ACT OF MAY 1, 1909

BY THE

PENNSYLVANIA DEPARTMENT OF AGRICULTURE

From January 1 to August 1, 1915

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1915

OATH OF FERTILIZER SAMPLING AGENT.

Commonwealth of Pennsylvania, ss:

Personally appeared before me,
ofCounty of and State
of Pennsylvania, who being duly sworn, according to law, doth de-
pose and say: That he has been duly appointed an agent of the De-
partment of Agriculture of Pennsylvania to collect samples of Com-
mercial Fertilizers for analysis, that he is not in any way interested
in the manufacture or sale of any fertilizer, and that he will per-
form the duties of the office with fidelity in accordance with the
requirements of law to the best of his ability, and as set forth in the
instructions issued by the Secretary of the Department of Agricul-
ture, governing the sampling of fertilizers in this State.

Sworn and subscribed before me, this }
..... day of }
A. D. } (Signed),
..... }
..... }

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**The Act of 1st May 1909, Commonly Referred to as
"The New Fertilizer Law" is as Follows:**

No. 205.

AN ACT

To regulate the manufacture and sale of commercial fertilizers; prescribing penalties for its violation, and repealing an act, entitled "An act to regulate the manufacture and sale of commercial fertilizers; providing for its enforcement, and prescribing penalties for its violation," approved the twenty-fifth day of March, Anno Domini one thousand nine hundred and one.

Section 1. Be it enacted, &c., That every package of commercial fertilizer sold, offered, or exposed for sale, for manurial purposes within this Commonwealth, except the dung of domestic animals, lime, marl, and wood-ashes, shall have plainly stamped thereon the name and address of the manufacturer or importer and his place of business, the net weight of the contents of the package, the brand or trade-name of the fertilizer the package contains, and an analysis stating the percentage such fertilizer contains of nitrogen in an available form, of potash soluble in water, of soluble and reverted phosphoric acid, and of insoluble phosphoric acid.

Section 2. Every manufacturer or importer of commercial fertilizers, as specified in section one of this act, shall, on or before the first day of January of each year, or before offering them for sale in this Commonwealth, file annually with the Secretary of Agriculture a statement of the names and number of brands of such commercial fertilizers, having distinct trade-names, that he shall offer for sale during the next ensuing year, and a copy of the analysis of each one of such brands of commercial fertilizers, as required by section one of this act.

Section 3. In addition to the statement required by section two of this act, every manufacturer or importer of commercial fertilizers shall, on or before the first day of January of each year, or before offering them for sale in this Commonwealth, file annually with the Secretary of Agriculture an affidavit showing the amount of each brand of fertilizer, having a distinct trade-name, sold within the Commonwealth during the last preceding year; and if the said amount shall be one hundred tons or less, he or they shall pay or cause to be paid to the Secretary of Agriculture the

sum of fifteen dollars for each and every brand of such commercial fertilizer, having a distinct trade name sold within the State during the last preceding year; and if the said amount shall exceed one hundred tons, and be less than five hundred tons, he or they shall pay the sum of twenty dollars, as aforesaid; and if the said amount shall be five hundred tons or more, he or they shall pay the sum of thirty dollars, as aforesaid. If such manufacturer or manufacturers, importer or importers, shall not have made any sales within the Commonwealth during the preceding year, he or they shall pay the sum of fifteen dollars upon each such brand, as aforesaid: Provided, That all monies so received shall be immediately paid by the Secretary of Agriculture into the State Treasury, for the use of the Commonwealth.

Section 4. No person shall sell, offer, or expose for sale, in this State, any pulverized leather, hair, ground hoofs, horns, or wool waste, raw, steamed, roasted, or in any form, as a fertilizer, or as an ingredient of a fertilizer or manure, without an explicit statement of the fact; said statement to be conspicuously affixed to every package of such fertilizer or manure, and to accompany and go with every lot, parcel, or package of the same.

Section 5. Any person or persons selling, offering, or exposing for sale, any commercial fertilizer or any brand of the same, having a distinct trade-name, without the analysis required by section one of this act, or with an analysis stating that it contains a larger percentage of any one or more of the above-named constituents than is contained therein, or for the sale of which all the provisions of sections two and three have not been complied with, or any person violating any of the provisions of section four of this act, shall be guilty of a misdemeanor, and, on conviction, shall be sentenced to pay a fine of not less than twenty-five nor more than one hundred dollars for the first offense, and not less than two hundred dollars for each subsequent offense. It shall be the duty of the Secretary of Agriculture to enforce the provisions of this act, and all penalties, costs, and fines recovered shall be paid to him or his duly authorized agent, and by him shall be immediately paid into the State Treasury, for the use of the Commonwealth.

Section 6. The Secretary of Agriculture is hereby empowered to collect samples of commercial fertilizers, either in person or by his duly qualified agent or representative, and to have them analyzed, and to publish the results for the information of the public; and for this purpose the said Secretary of Agriculture, such assistants, agents, experts, chemists, detectives, and counsel as he shall duly authorize, shall have full access, ingress, and egress to and from all places of

business, factories, barns, buildings, carriages, cars, and vessels, used in the manufacture and transportation, or sale, of any commercial fertilizer. They shall also have power to open any package or vessel containing or supposed to contain any commercial fertilizer, and take therefrom samples for analysis, upon tendering the value of said samples.

Section 7. The term "commercial fertilizers," as used in this act, shall be construed to mean any and every substance imported, manufactured, prepared, or sold for fertilizing or manuring purposes, except the dung of domestic animals, marl, lime, and wood-ashes, and not exempt by the provisions of section one of this act.

Section 8. This act shall go into effect on and after the thirty-first day of July, one thousand nine hundred and nine; and the act, entitled "An act to regulate the manufacture and sale of commercial fertilizers; providing for its enforcement, and prescribing penalties for its violation," approved the twenty-fifth day of March, Anno Domini one thousand nine hundred and one, is hereby repealed.

Approved—The 1st day of May, A. D. 1909.

EDWIN S. STUART.

No. 95.

AN ACT

Making it unlawful for any person, firm, or corporation, engaged in the manufacture or sale of commercial fertilizers, to use the word "bone" in connection with, or as part of the name of, any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fertilizer shall be the product of pure animal bone; and providing a penalty for violation of the same.

Section 1. Be it enacted, &c., That it shall be unlawful for any person, firm or corporation, engaged in the manufacture or sale of commercial fertilizers, to use the word "bone" in connection with, or as part of the name of, any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fertilizer shall be the product of pure animal bone.

Section 2. Any person or persons violating the provisions of this act shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall pay a fine of fifty dollars for the first offense, and a fine of not less than one hundred dollars, nor more than two hundred dollars, for every subsequent offense; such fine or fines to be paid into the State Treasury, for the use of the Commonwealth: The Secretary of Agriculture shall, together with his deputies, agents, and assistants, be charged with the enforcement of this act.

Section 3. All magistrates, aldermen, and justices of the peace throughout this Commonwealth shall have jurisdiction to hear and determine actions arising from violations of the provisions of this act, and shall have authority to hold for court, or to impose the penalty hereby prescribed, subject to appeal, as the law shall direct.

Section 4. This act shall go into effect on the first day of January, Anno Domini nineteen hundred and ten.

Approved—The 23d day of April, A. D. 1909.

EDWIN S. STUART.

State College, Pa., Aug. 9, 1915.

Hon. N. B. Critchfield, *Secretary of Agriculture, Harrisburg, Pa.:*

Dear Sir: I have the honor to transmit herewith my report upon the analyses of the samples of commercial fertilizers received from official sampling agents during the spring season of 1915.

Very respectfully,

WM. FREAR,

Vice-Director and Chemist.

The Penna. State College Agricultural Experiment Station.

FERTILIZER VALUATIONS.

The object of an official valuation of commercial fertilizers is to enable the consumer to judge approximately whether he has been asked to pay for a given brand more than the fertilizing ingredients it contains and market conditions prevailing at the time would warrant. It is clear, therefore, that no attempt is made in this valuation to indicate whether the fertilizer valued possesses a greater or less crop-producing capacity than another fertilizer; but only whether it is higher priced than another of the same general composition.

For this purpose the valuation must be so computed as to include all the elements entering into the cost of a fertilizer as it is delivered to the consumer. These elements differ with the conditions of sale. Sales to consumers fall chiefly into two classes: (1) Those made directly from the jobber or manufacturer to the consumer, without the service of a local agent or dealer. Such sales are usually in relatively large lots for cash. (2) Those made through a local agent or dealer. These are most commonly made in relatively small lots and often with arrangements for deferred payments.

In some States, the valuations are so made as to represent sales only of the former class. In Pennsylvania, however, the principal volume of sales is of the second class, and the method of valuation has, therefore, included the additional cost elements involved in this mode of sale. The several cost elements or factors may conveniently be grouped as follows:

1. The wholesale cost of the ingredients.
2. The jobbers' gross profit on the sale of the ingredients; this includes office expenses, advertising, losses, etc.; for the purpose of the present computation it may be assumed that the sum of this gross profit and the wholesale cost of the ingredients, is equivalent to the retail price of the single ingredients near the wholesale markets in ton lots of original packages for cash.
3. The expense and profit of mixing: This item applies only to complete fertilizers, rock and potash, and ammoniated rock; not to dissolved or ground bone, or to dissolved rock.
4. The expense and profit of bagging.
5. Agents' commission: This item includes not only the commission proper, but every advance in price due to the sale of the goods through an agent in small quantities on time, rather than directly to the consumer in ton lots for cash.

6. Freight from the wholesale market to the point of delivery.

The valuations for 1915 are based:

1. Upon the wholesale prices from September 1, 1914, to March 1, 1915, of the raw materials used in fertilizer manufacture, the quotations of the New York market being adopted for all materials except acidulated phosphate rock and ground bone.

2. Upon an allowance of 20 per cent. of the wholesale prices, above mentioned, to cover jobbers' gross profit.

By adding the 20 per cent. allowed for jobbers' gross profit to the wholesale price of the several raw materials, the retail price in original packages at the jobbers' warehouse is obtained.

Since the amount of the several valuable fertilizing constituents in the various raw materials is known, it is a simple matter to determine the corresponding retail value per pound of the valuable fertilizing constituents yielded by each raw material. A schedule of these pound values affords a convenient basis of computation of the value per ton of various fertilizers, whose composition is ascertained by analysis.

The values assigned, for the present, to the other elements in the cost of the fertilizer at the point of delivery are:

3. For mixing, \$1.00 per ton.

4. For bagging, \$1.00 per ton, in all cases except those in which the article was sold in original packages; the cost of the package being, in such case, included in the wholesale price.

5. For agents' commission, 20 per cent. of the cost of the goods f. o. b. at the jobbers' or mixers' warehouse.

6. For freight, \$2.00 per ton; the cost of the freight in lots of twelve tons or over, from the seaboard to Harrisburg, averaging \$1.88 per ton.

The following valuation of dissolved South Carolina rock illustrates the method:

Phosphoric Acid.	%	Weight per ton.	
Available	14.00	220 lbs. at 3c.	\$6.40
Insoluble,	1.00	20 lbs. at 1½c. ....	.00
Retail cash value of ingredients,			8.70
Bagging,			1.00
Cash value of goods ready for shipment,			9.70
Agents' commission, 20 per cent.,			1.94
Freight,			2.00
Commercial value per ton,			\$13.64

It is not to be expected, of course, that the valuations thus computed will precisely represent the fair price to be charged for a brand in each locality and in every transaction. Market conditions,

competition, distance from factory, all introduce minor variations. Nevertheless, to make the approximation reasonably close the average valuation of a given class of goods ought to agree closely with its ascertained average selling price. Whenever such an agreement is no longer obtained by the use of a schedule, it is evident that the schedule of retail values of the constituents, or the added allowances for mixing, etc., requires revision.

It is needful to note here another factor greatly affecting the practical accuracy of these approximations. Their computation would offer little difficulty and their usefulness be far greater, if, by the ordinary methods of analysis, the exact nature of the ingredients used to supply the several fertilizer constituents, were capable of certain determination. This is, however, possible to-day to only a limited extent. The valuations are therefore based in general on the assumption that the fertilizers are uniformly compounded from high quality ingredients, such as are commonly employed in the manufacture of fertilizers of the several classes. Consumers should carefully avoid the error of accepting such valuations as infallible; they are not designed to be used for close comparisons of single brands, but only to indicate whether the price asked for a fertilizer is abnormal, assuming good quality for the ingredients used. From this it is clear that, *except as high freights may require, the selling price of a brand should not far exceed the valuation; but that a fertilizer may be made of inferior materials and yet have a high valuation.*

The valuations used during 1914 have been modified for use during 1915 in accordance with the changes in wholesale prices of fertilizing ingredients and to make the valuations more closely follow the selling price.

The following comparative statement shows the valuations and selling prices of the several classes of fertilizers during 1910 to 1914.

Fertilizers.	Number of samples.	Valuation.	Selling price.	Difference of valuation from selling price.
Spring, 1910.				
Complete,	436	26.26	25.28	1.27
Rock-and-potash,	122	16.06	17.16	-1.06
Dissolved bone,	8	21.47	22.17	-1.70
Ground bone,	24	26.27	26.12	.06
Dissolved rock,	47	14.60	14.66	-.06
Fall, 1910.				
Complete,	204	23.24	21.76	.48
Rock-and-potash,	100	16.24	16.32	-.04
Dissolved bone,	4	25.70	25.30	.10
Ground bone,	22	21.10	20.22	1.12
Dissolved rock,	23	14.15	14.04	.14

Fertilizers.	Number of samples.	Valuation.	Selling price.	Difference of valuation from selling price.
Spring, 1911.				
Complete,	485	26.95	24.97	.98
Rock-and-potash,	129	15.90	17.05	-1.05
Dissolved bone,	6	22.32	20.33	3.49
Ground bone,	23	21.47	20.98	.54
Dissolved rock,	51	14.36	15.53	.97
Fall, 1911.				
Complete,	292	22.32	21.73	.60
Rock-and-potash,	129	16.07	16.25	-.15
Dissolved bone,	3	21.51	24.38	-3.37
Ground bone,	25	21.12	21.17	-.01
Dissolved rock,	42	13.73	14.00	.22
Spring, 1912.				
Complete,	470	27.24	27.64	.40
Rock-and-potash,	137	16.26	18.27	2.01
Dissolved bone,	4	18.92	20.94	2.02
Ground bone,	24	32.26	33.21	.55
Dissolved rock,	43	14.20	14.69	.49
Fall, 1912.				
Complete,	283	22.40	22.16	1.23
Rock-and-potash,	124	16.55	15.83	.67
Dissolved bone,	4	25.50	23.80	1.70
Ground bone,	25	24.24	20.55	4.29
Dissolved rock,	42	12.92	12.30	.13
Spring, 1913.				
Complete,	531	26.44	25.98	1.36
Rock-and-potash,	140	16.52	16.75	-.23
Dissolved bone,	4	21.93	13.55	3.03
Ground bone,	23	22.50	23.98	-1.38
Dissolved rock,	43	14.25	13.94	.29
Fall, 1913.				
Complete,	292	24.26	21.92	3.44
Rock-and-potash,	140	16.35	16.25	.00
Dissolved bone,	6	24.26	24.75	-.49
Ground bone,	25	32.63	31.12	1.51
Dissolved rock,	40	13.70	13.51	.19
Spring, 1914.				
Complete,	505	26.28	24.72	2.21
Rock-and-potash,	121	15.90	14.79	-1.19
Dissolved bone,	4	27.22	28.75	-1.62
Ground bone,	22	20.15	21.42	-1.28
Dissolved rock,	30	13.71	14.42	-.77
Fall, 1914.				
Complete,	231	22.64	20.89	1.81
Rock-and-potash,	99	15.42	15.21	.21
Dissolved bone,	2	19.02	16.05	2.97
Ground bone,	23	32.45	32.20	.25
Dissolved rock,	38	13.97	13.73	.19

In ammoniates such as dried blood and fish guano, the unit is of ammonia, of which 82.25 per cent is nitrogen; in acid phosphate the unit is of phosphoric acid (phosphorus pentoxid).

There has been a decided rise in the prices of some of the organic ammoniates, and of ammonium sulphate, and a decrease in the cost of nitrogen from nitrate of soda.

Phosphate rock and sulphuric acid show little change in prices compared with last year, but acid phosphate a considerable decrease.

Composition of Raw Materials.—In order to form a correct idea of the cost per pound of the fertilizer constituents of these materials, it is needful to determine their composition or, in other words, the quantities of valuable constituents each contains. The following table shows the composition of raw materials used in the manufacture of fertilizers. Few analyses of these materials, with the exception of ground bone and dissolved rock, have been made in Pennsylvania. The figures in the following table include the averages of the results of analyses made in Connecticut, New Jersey and Massachusetts during the past year, except in the case of ground bone and dissolved rock phosphates, where Pennsylvania results alone are included.

The following statement from the weekly reports of the Oil, Paint and Drug Reporter, of New York City, shows the average wholesale prices of fertilizer ingredients in the market, Sept. 1, 1914, to March 1, 1915:

Substance.	Amount Priced.	Average price Sept. 1, 1913 to March 1, 1914.	Average price Sept. 1, 1914 to March 1, 1915.	Prices Sept.-March, 1914-1915 in per cent. of prices of 1913-1914.
Sulphate of Ammonia,	Cwt.,	2.290	2.748	120.0
Nitrate of Soda,	Cwt.,	2.230	1.637	84.58
Dried Blood, H. G.,	Unit, (20 lbs.),	2.110	2.089	99.23
Concentrated Tankage,	Unit, (20 lbs.),	2.76	2.943	106.63
Rough Bone,	Ton,	29.25	23.25	100.00
Bone Meal,	Ton,	29.25	29.25	100.00
Fish Guano, dry,	Unit, (20 lbs.),	3.81	3.28	96.13
Phosphate Rock, Tenn.,	Ton,	5.25	5.25	100.00
Acid phosphate,	Unit, (20 lbs.), .....	.525	.475	90.47
Double manure salt,	Ton,	24.97	.....	.....
Sulphate of potash,	Ton,	47.156	.....	.....
Kainit,	Ton,	8.425	.....	.....
Muriate of potash,	Ton,	23.856	.....	.....
Sulphuric acid, 66°B,	Cwt.,	1.05	1.05	100.00

Composition of Non-Acidulated Fertilizer Ingredients, (Per Cent.)

Substance.	Number of samples analysed.	Nitrogen.	Potash.	Phosphoric acid.
Sulphate of ammonia,	2	20.53	.....	.....
Nitrate of soda,	39	15.90	.....	.....
Dried blood,	8	12.14	.....	.....
Ground bone,	26	2.92	.....	24.01
Tankage,	32	5.85	.....	11.44
Ground fish,	19	8.44	.....	6.69
Cottonseed meal,	224	6.90	.....	.....
Sulphate of potash,	10	.....	49.46	.....
Muriate of potash,	38	.....	50.49	.....
Kainit,	16	.....	12.55	.....
Double salt of kainit and,	2	.....	27.51	.....

Composition of Acidulated Fertilizer Ingredients. (Per Cent.)

	Number of samples.	Total phosphoric acid.	Insoluble phosphoric acid.	Nitrogen.
Dissolved bone,	6	14.54	3.28	1.88
Dissolved phosphate rock,	68	15.53	1.01	.....

Cost per Pound of Fertilizer Constituents.—With the composition of these raw materials and their price per ton, hundred weight, or other unit of measure as a basis, the wholesale cost per pound of the valuable constituents can readily be calculated. In many cases the ammoniates are quoted “per unit of ammonia,” the term unit being equivalent to per cent.; in goods sold by the ton of 2,000 lbs., the unit is equal to 20 lbs., and 20 lbs. of ammonia contain 16.47 lbs. of nitrogen.

In the case of refuse bone-black, unacidulated, the mean, 28.25 per cent. of phosphoric acid, is assumed to represent the average material on the market.

Phosphate rock is sold by the ton of 2,240 lbs., and on the basis of the bone phosphate of lime it contains, with drawbacks for injurious constituents. Bone-phosphate of lime contains 45.8 per cent.

of phosphoric acid; therefore, each per cent. of bone phosphate in a long ton is equivalent to 22.4 lbs., and contains 10.26 lbs. of phosphoric acid.

In the wholesale trade, dried blood, azotine, concentrated tankage and hoof meals are usually sold on the basis of ammonia, disregarding the phosphoric acid present.

Insoluble phosphoric acid in dissolved rock is likewise omitted from consideration, contracts being based solely upon the "available" phosphoric acid; nor in rock phosphates is any claim made for the small quantities of nitrogen and potash they contain, nor in dissolved bone for the potash present.

Under these conditions, the wholesale cost per pound in New York of the valuable constituents of such materials as furnish but a single fertilizing element, these materials being assumed to be in the state of preparation and in the packing in which the manufacturer purchased them, are given in the following table; also a figure representing a fair retail price at the factory, the materials having undergone no change in treatment or packing and the allowance for expenses and profit in retailing being 20 per cent.

Wholesale Cost per Pound of Fertilizing Constituents, New York.

1. Ingredients Supplying One Constituent.

Materials.	Constituents Valued.	Wholesale price. Cents.	Wholesale price plus 20 per cent. Cents.
Sulphate of ammonia,	Nitrogen,	12.25	14.67
Nitrate of soda,	Nitrogen,	12.06	14.47
Dried blood,	Nitrogen,	13.84	16.61
Concentrated tankage,	Nitrogen,	17.95	21.54
Phosphate rock, Tenn., 78 per cent.,	Phosphoric acid, (total)* .....	.66	.79
Acid phosphate,	Phosphoric acid, available,	2.37	2.84

*The prices of phosphate rock are f. o. b. at the respective points of shipment, not New York. The prices for potash are taken from the schedule of the syndicate, and those of the remainder from the Oil, Paint and Drug Reporter.

The quotations for bone are given without specific reference to quality, so that it is impossible, from these data, fairly to apportion their several wholesale values to the nitrogen and phosphoric acid contained in this material. As compared with tankage, the general tendency is to assign a higher commercial rating to the phosphoric acid in bone, and to the nitrogen, a rating not very different from that given in tankage.

In former years, the value assigned to the bone nitrogen has been the same as that quoted on crushed tankage, c. a. f. Baltimore. In

later years, quotations for both crushed tankage and ground tankage have not been available, and for that reason, the value of bone nitrogen is based upon the quotations for concentrated tankage.

In earlier years, quotations on ground tankage have been about 5 per cent. in advance of those on concentrated tankage; also quotations on crushed tankage were on an average 12.67 per cent. in advance of those on ground tankage. Increasing the price of concentrated tankage by these percentages, we have \$3.46 per unit of ammonia as the value assigned to the nitrogen in bone.

This is equivalent to \$4.19 per unit of nitrogen.

The average composition of the ground bone and bone meal samples analyzed last year in Pennsylvania was: Phosphoric acid, 22.35 per cent.; nitrogen 3.24 per cent.

The prepared bone contains less fat and moisture, and often less nitrogen than the ordinary rough bone, but these differences tend, in a measure, to neutralize each other. Assuming for the rough bone quoted in the New York market the same composition as the bone meal sold in Pennsylvania, and for the value of the nitrogen \$4.19 per unit, as previously stated, the values per pound of the several constituents would be:

Wholesale Cost per Pound of Fertilizer Constituents, New York.

II. Bone.

Materials.	Constituents Valued.	Wholesale price. Cents.	Wholesale price, plus 20 per cent.
Rough bone,	{ Nitrogen,	20.95	25.14
	{ Phosphoric acid,	3.17	2.90
Ground bone,	{ Nitrogen,	20.95	25.14
	{ Phosphoric acid,	3.45	4.14

Valuation in Neighboring States.

It is desirable, from all points of view, that the schedules of valuation throughout a district in which similar market conditions prevail, should differ as little as possible. It has been our practice in the past, to conform our schedule to that adopted after very careful cooperative study of the market conditions for each year, by the New England States, New York and New Jersey, except where the peculiar conditions of our markets have been made the valuations

diverge too largely from the actual selling prices, as in the case of ground bone and dissolved rock phosphates. The schedules for these States for 1914 and 1915 are as follows:

Trade Values Adopted by the New England States and New Jersey.

	Cents per Pound.		Value in 1915 in per cent. of those in 1914.
	1914.	1915.	
Nitrogen:			
In nitrates,	16½	15	90.0
In ammonium salts,	16½	15½	98.9
In dry and fine ground fish and blood,	22½	22	97.7
In fine bone and tankage,	21½	21	97.6
In coarse bone and tankage,	17½	17	97.2
In mixed fertilizers,	19½	19	97.5
Phosphoric acid:			
Water soluble,	4½	4	88.9
Citrate soluble,	4	3½	87.5
In fine ground bone and tankage,	4	4	100.0
In coarse bone and tankage,	3½	3½	100.0
In mixed fertilizers, insoluble,	2	2	100.0
Potash:			
In forms free from muriate,	5	9½	190.0
As muriate,	4	8½	212.5

Valuations in Pennsylvania.

For reasons stated on the previous page, the New England schedule has been followed in the case of mixed fertilizers and dissolved bones.

In the case of the dissolved rocks, the wholesale prices of raw materials used in their manufacture and of the available phosphoric acid itself, having shown no material change, the values used in the Pennsylvania schedule for 1914 are continued for use during the present year.

With respect to the potash and nitrate salts, the experience of recent years has shown a growing increase in the proportion of the official samples that represent direct cash purchases in large quantities. The result has been that the commercial valuations, based upon the conditions and costs of sale in small quantities, through local agents and on time, came to be, in a large fraction of the cases represented by these salts whose analyses are reported in the miscellaneous group, strikingly higher than the selling prices quoted. *For this reason, it has appeared needful to proceed, hereafter, upon the assumption that all potash and nitrate salts sold unmixed as such, have been purchased at what are virtually jobbers' prices plus freight, and to adopt*

corresponding pound values. In the case, however, of potash and nitrogen in mixed fertilizers, the computation will be made as heretofore, upon the assumed basis of sale on time, in small quantities and through local dealers.

Buyers who are interested in the comparative jobbing prices of other materials, will find the data in the preceding pages.

The entire schedule adopted for use in this State is presented in the following table.

Pennsylvania Schedule of Values for Fertilizer Ingredients, 1915.

	Cents Per Pound.
Nitrogen:	
In ammonium salts,	15½
In nitrates,	15
In meat, d'-led blood, etc.,	22
In mixed fertilizers,	19
In fine ground bone and tankage,	17
In coarse bone and tankage,	15
Phosphoric acid:	
Available in bone fertilizers,	33
Available in rock fertilizers,	23
Insoluble in ammonium citrate, in bone fertilizers,	2
Insoluble in ammonium citrate, in rock fertilizers,	1
In fine bone, tankage and fish,	34
In coarse bone and tankage,	24
Potash:	
In high grade sulphate of other forms free from muriate,	94
As muriate,	84

FERTILIZERS ANALYSES JANUARY 1 TO AUGUST 1, 1915.

Since January 1, 1915, there have been received from authorized sampling agents one thousand six hundred fertilizer samples, of which six hundred and ten were subjected to analysis. Preference was given to those which have not been recently analyzed. In cases where two or more samples representing the same brand were received, equal portions from several samples were united, and the composite sample was subjected to analysis.

The samples analyzed group themselves as follows: 422 complete fertilizers, furnishing phosphoric acid, potash and nitrogen; 9 dissolved bones, furnishing phosphoric acid and nitrogen; 86 rock-and-potash fertilizers, furnishing phosphoric acid and potash; 48 acidulated rock phosphates, furnishing phosphoric acid only; 24 ground bones, furnishing phosphoric acid and nitrogen, and 21 miscellaneous samples, which group includes substances not properly classified under the foregoing heads.

The determinations to which a complete fertilizer is subjected are as follows: (1) Moisture, useful for the comparison of analyses, for indication of dry condition and fitness for drilling, and also of the conditions under which the fertilizer was kept in the warehouse. (2) Phosphoric acid—total and insoluble; the latter is, that portion not soluble in water nor in warm ammonium citrate solution (a solution supposed to represent the action of plant roots upon the fertilizer), which is assumed to have little immediate food value. By difference, it is easy to compute the so-called “available” phosphoric acid. (3) Potash soluble in water—most of that present in green sand marl and crushed minerals, and even some of that present in vegetable materials such as cotton-seed meal, not being included because insoluble in water even after long boiling. (4) Nitrogen—This element is determined in such manner as to ascertain its *total* quantity and also, the quality of the organic nitrogenous material present in the finished fertilizer. The fertilizer is washed thoroughly with water, which removes the nitrates, ammonium salts and almost all of the cyanamid nitrogen, and the soluble organic nitrogenous materials. These are not separately determined but are grouped under the name “*water-soluble nitrogen*.” The quantity of *water-insoluble nitrogen* is directly determined, and by difference between its amount and the total nitrogen, the water-soluble nitrogen is calculated. Another portion of water-insoluble material* is treated with alkaline potassium permanganate, which attacks the nitrogenous organic substances present, and converts the more active portion into ammonia, which is distilled off, determined, and its nitrogen calculated as “*active insoluble nitrogen*.” The “*inactive insoluble nitrogen*” is then computed by subtracting the active insoluble from the total insoluble nitrogen. The term “available nitrogen” as used in this report, is the sum of the water-soluble and the active insoluble nitrogen. It is equivalent to the total nitrogen less the inactive insoluble nitrogen. In high grade organic nitrogenous materials, among which, from its behavior with this treatment, must be included horn meal, the percentage of inactive nitrogen in the insoluble nitrogen is usually under 40 per cent; and the ratio of inactive to active insoluble nitrogen in such materials is usually less than 60:100. On the other hand, in the case of low-grade nitrogenous materials, the proportions of inactive nitrogen are much higher. The separations effected by these methods are therefore of great value in distinguishing whether the insoluble nitrogen is derived from high grade materials, or from low grade substances such as garbage tankage, peat, morn meal, unacidulated hair, leather, etc. There is, however, one fertilizer ingredient rapidly coming into use, whose presence may lead to erroneous conclusion, if judgment is based

*This determination has been omitted in all cases where the insoluble nitrogen is only .2 per cent. or less.

solely upon the facts ascertained by the foregoing method, namely, cyanamid. This substance contains from 13 to 16.5 per cent. of nitrogen, of which 12 to 14.7 per cent. is soluble in water, by the mode of treatment used in the alkaline permanganate method; and, of the 1.0 to 1.7 per cent. of water-insoluble nitrogen, less than one-fifth is active; so that the ratio of inactive to insoluble nitrogen is about 80:100. Owing to its tendency to reduce the availability of the phosphoric acid in acid phosphate mixtures, limited quantities only of this ingredient can be used advantageously in mixed fertilizers. Nevertheless, in cases where low grade sources of nitrogen are indicated by the foregoing method, it would be needful to determine, by supplementary tests, whether or not cyanamid may be present to account for an undue proportion of inactive, insoluble nitrogen, before concluding that such excess of inactive nitrogenous material is attributable to low-grade nitrogenous constituents. It is desirable to keep in mind at this point the fact also that certain widely used low-grade nitrogenous substances, such as garbage tankage, peat and mora meal, are not included in the list of substances whose presence requires specific declaration under Section 4 of the Fertilizer act. (5) Chlorin—this determination is made to afford a basis for estimating the proportion of the potash that is present as chlorid or muriate, the cheaper source. The computation is made on the assumption that the chlorin present, unless in excess, has been introduced in the form of muriate of potash; but doubtless there are occasional exceptions to this rule. One part of chlorin combines with 1.326 parts of potash to form the pure muriate; knowing the chlorin, it is, therefore, easy to compute the potash equivalent thereto. (7) In the case of ground bone, the state of sub-division is determined by sifting through accurately made sieves; the cost of preparation and especially the promptness of action of bone in the soil depend very largely on the fineness of its particles, the finer being much more quickly useful to the plant.

The legislation of 1909 has made needful some additional tests. Section 4, of the Act of May 1, 1909, prohibits the sale of "pulverized leather, hair, ground hoof, horns, or wool waste, raw, steamed, roasted, or in any form, as a fertilizer, or as an ingredient of a fertilizer or manure, without an explicit statement of the fact." All nitrogenous fertilizers have, therefore, been submitted to a careful microscopic examination, at the time of preparing the sample for analysis, to detect the presence of the tissues characteristic of the several materials above named.

The act of April 23, 1909, makes it unlawful to use the word "bone" in connection with, or as part of the name of any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fer-

tilizer shall be the product of pure animal bone. All fertilizers in whose name the word "bone" appears, were therefore examined by microscopic and chemical methods to determine, so far as possible with present knowledge, the nature of the ingredient or ingredients supplying the phosphoric acid. It is a fact, however, well known to fertilizer manufacturers and which should be equally understood by the consumer, that it is, in certain cases, practically impossible to determine the source of the phosphoric acid by an examination of the finished fertilizer. The microscope shows clearly the structure of raw bone, but does not make it possible to discriminate between thoroughly acidulated bone and acidulated rock. The ratio of nitrogen to phosphoric acid in a raw bone—and only such bone as has not been deprived of any considerable proportion of its nitrogenous material by some manufacturing process can properly be called "pure animal bone"—is about 1:8, in cases where the ratio of phosphoric acid to nitrogen exceeds 8, it is clear that part, at least, of the phosphoric acid has been supplied by something else than pure animal bone; but, inasmuch as nitrogen may have been introduced in some material other than bone and no longer detectible by the microscope, the presence of nitrogen and phosphoric acid in the proportions corresponding to those of bone is not proof positive that they have been supplied by bone. Finally, the differences in the iron and silica content of bone and rock respectively, afford means of distinction useful in some cases; the usefulness of this distinction is limited, however, by the facts that kitchen bone frequently contains earthy impurities rich in iron and silica, and that earthy fillers can legally be used in fertilizers and are in fact considerably used therein both as "make-weights" and as "conditioners," or materials introduced to improve the drilling qualities of the goods. The fact that the phosphoric acid in bone and rock are identical in character is probably so well known as to require no detailed consideration in this connection.

The law having required the manufacturer to guarantee the amount of certain valuable ingredients present in any brand he may put upon the market, chemical analysis is employed to verify the guaranties stamped upon the fertilizer sacks. It has, therefore, been deemed desirable in this report to enter the guaranty filed by the manufacturer in the office of the Secretary of Agriculture, in such connection with the analytical results that the two may be compared. An unfortunate practice has grown up among manufacturers of so wording the guaranty that it seems to declare the presence in the goods of an amount of valuable constituent ranging from a certain minimum to a much higher maximum; thus, "Potash, 2 to 4 per cent." is a guaranty not infrequently given. In reality, the sole guaranty is for

2 per cent. The guaranteed amounts given for each brand in the following tables, are copied from the guaranties filed by the maker of the goods with the Secretary of Agriculture, the lowest figure given for any constituent being considered to be the amount guaranteed. For compactness and because no essentially important fact is suppressed thereby, the guaranties for soluble and reverted phosphoric acid have not been given separately, but are combined into a single guaranty for available phosphoric acid; in cases where the maker's guaranty does not specifically mention available phosphoric acid, the sum of the lowest figures given by him for soluble and reverted phosphoric acid is used. The law of 1879 allowed the maker to express his guaranty for nitrogen either in terms of that element or in terms of the ammonia equivalent thereto; since ammonia is composed of three parts of hydrogen and fourteen parts of nitrogen, it is a very simple matter to calculate the amount of one, when the amount of the other is given; the amount of nitrogen multiplied by 1.214 will give the corresponding amount of ammonia, and the amount of ammonia multiplied by 0.824 will give the corresponding amount of nitrogen. In these tables, the expression is in terms of nitrogen. The laws of 1901 and 1909 abolished the alternative and required that the quantity shall be given in terms of nitrogen.

Many manufacturers, after complying with the terms of the law, insert additional items in their guaranties, often with the result of misleading or confusing the buyer; the latter will do well to give heed to those items only that are given as the law requires and that are presented in these tables:

Summary of Analyses Made this Season.

	Complete fertilizers.	Rock and potash.	Dissolved bone.	Dissolved rock.	Ground bone.
Number of analyses,	422	86	9	48	24
Moisture, per cent.,	7.89	8.06	5.91	7.99	8.52
Phosphoric acid:					
Total, per cent.,	10.56	12.35	12.85	16.87	21.46
Available, per cent.,	9.05	11.29	9.74	15.84	.....
Insoluble, per cent.,	1.51	1.06	2.61	1.03	.....
Potash, per cent.,	8.06	2.16	.....	.....	.....
Nitrogen, per cent.,	1.95	.....	2.01	.....	2.96
Mechanical analyses of bone:					
Fine, .....	.....	.....	.....	.....	53
Coarse, .....	.....	.....	.....	.....	47
Commercial valuation,*	28.45	16.47	24.30	13.87	30.26
Average selling price,*	25.50	16.90	24.69	14.00	33.44

*Dollars per ton.

The average selling prices for the several classes of fertilizers as compared with the corresponding commercial valuations, show several interesting discrepancies between these items. In case of the complete fertilizers, the average selling price is \$2.95 lower than the valuation. The valuation was raised chiefly with respect to potash, which had been extensively quoted in January and February of this year at rates corresponding to $8\frac{1}{2}$ to $9\frac{1}{2}$ cents a pound, according to source. For 61 pounds of potash present in the fertilizer, this quotation represents an increase over 1914 values of \$2.59. If the potash in complete fertilizers is being sold at 1914 values, the difference between valuation and selling price here noted would be accounted for. In the case of rock and potash brands, such condition does not appear.

In the case of ground bones, the average selling price is \$3.18 a ton higher than the valuation. This price movement was not at all indicated by either the New York wholesale prices up to March 1st, 1915, nor by the New England and New Jersey quotations of about that date.

"For the purpose of indicating more specifically to the eye, cases deficient from guaranty, an asterisk has been affixed in the analytical tables where the ingredient has been found less in quantity than the manufacturer guaranteed. Too great emphasis should not be placed upon very slight deficiencies, because very slight imperfections in mixing and slight variation in analysis are practically unavoidable. The asterisk has been used, therefore, only in cases where the deficiencies amount to 0.2 per cent. or more, except where nitrogen has been guaranteed in amounts no higher than 1.0 per cent., in which case an asterisk has been affixed where the deficiency amounts to 0.1 per cent. or more."

The cases of departure of goods from their guaranteed composition observed this season, including only those cases in which it amounted to 2-10 per cent. or more were as follows:

Summary of Instances of Deficiency from Guaranty.

	Complete fertilizers.	Rock and potash.	Dissolved bone.	Dissolved rock.	Ground bone.
Deficient in four constituents,	0	0	0	0	0
Deficient in three constituents,	2	0	0	0	0
Deficient in two constituents,	23	4	3	1	3
Deficient in one constituent,	85	12	33	16	33
Total number of samples in which deficiencies occur, ..	90	12	33	17	33

The cases of deficiency noted during the past nine seasons in the composition of goods as compared with their guaranties, expressed in percentage of the total number of goods of each class analyzed, are as follows:

Percentage of Deficiency, 1910-1915.

	Spring, 1910.	Fall, 1910.	Spring, 1911.	Fall, 1911.	Spring, 1912.	Spring, 1912.	Fall, 1912.	Spring, 1914.	Fall, 1914.	Spring, 1915.
Complete fertilisers,	23.9	35.9	45.1	46.9	29.0	32.2	46.0	33.1	27.1	21.8
Dissolved bone,	37.5	25.0	16.6	100.00	50.0	50.0	66.7	50.0	0.0	33.3
Rock and potash,	25.2	37.0	27.1	43.4	33.6	26.4	46.0	26.7	35.8	14.0
Dissolved rock,	4.3	6.3	5.9	11.9	12.5	20.9	22.5	23.3	18.9	14.7
Ground bone,	29.17	27.6	47.8	20.0	29.2	25.0	22.2	47.8	31.8	13.5
All classes except miscellaneous,	26.5	33.5	33.7	46.0	36.0	30.4	35.0	32.0	28.0	19.6

The work of this season shows an unusually excellent conformity of composition to guaranty,

A comparison of the average composition of all samples of complete fertilizers for which guaranties are recorded with the average of the corresponding guaranties, for several seasons past, including those of this season, follows:

Average Composition and Guaranty Compared.

	Average composition. Per cent.	Per cent.
Spring, 1909.		
Phosphoric acid, Total,	9.33	9.30
Available,	8.97	7.93
Potash,	5.97	4.89
Nitrogen,	1.67	1.90
Fall, 1909.		
Phosphoric acid: Total,	10.12	9.34
Available,	8.27	8.03
Potash,	3.41	3.12
Nitrogen,	1.33	1.26
Spring, 1910.		
Phosphoric acid: Total,	9.30	8.30
Available,	8.28	7.63
Potash,	5.20	4.63
Nitrogen,	1.63	1.90

	Average guaranty. cent.	Per cent.
Fall, 1910.		
Phosphoric acid: Total,	9.73	8.96
Available,	8.28	7.62
Potash,	5.20	4.06
Nitrogen,	1.63	1.00
Spring, 1911.		
Phosphoric acid: Total,	9.86	8.96
Available,	8.81	7.86
Potash,	4.97	4.06
Nitrogen,	1.58	1.54
Fall, 1911.		
Phosphoric acid: Total,	9.59	9.09
Available,	8.20	7.87
Potash,	3.63	3.39
Nitrogen,	1.12	1.19
Spring, 1912.		
Phosphoric acid: Total,	9.51	8.82
Available,	8.09	7.78
Potash,	5.34	5.05
Nitrogen,	1.56	1.58
Fall, 1912.		
Phosphoric acid: Total,	9.90	9.07
Available,	8.22	7.83
Potash,	4.06	3.57
Nitrogen,	1.28	1.30
Spring, 1913.		
Phosphoric acid: Total,	9.71	8.82
Available,	8.11	7.87
Potash,	5.41	5.17
Nitrogen,	1.61	1.62
Fall, 1913.		
Phosphoric acid: Total,	9.86	9.09
Available,	8.06	7.83
Potash,	4.28	4.27
Nitrogen,	1.47	1.36
Spring, 1914.		
Phosphoric acid: Total,	9.81	8.71
Available,	8.06	7.65
Potash,	5.67	5.52
Nitrogen,	1.81	1.69
Fall, 1914.		
Phosphoric acid: Total,	9.84	9.25
Available,	8.41	8.00
Potash,	3.43	2.99
Nitrogen,	1.39	1.27
Spring, 1915.		
Phosphoric acid: Total,	10.56	9.34
Available,	9.05	8.00
Potash,	3.05	3.12
Nitrogen,	1.96	1.82

MATERIALS USED IN FERTILIZERS.

The sampling agents report no case of declaration under the requirements of Section 4 of the fertilizer law, nor has microscopic examination shown any decisive evidence of the presence in any fertilizer of more than accidental traces of any of the substances specified in that section.

On the other hand, the results of the examination of the condition of the nitrogen in the complete fertilizers by the alkaline permanganate method affords much that is suggestive.

To keep the tables down to convenient size, the percentages of active insoluble nitrogen found have been omitted. They can be computed, however, from the figures given, by deducting from the total nitrogen the sum of the soluble and the inactive insoluble nitrogen. The ratio which the active insoluble bears to the inactive insoluble nitrogen being the principal indication the method as here used gives respecting the character of the organic nitrogenous ingredients of the fertilizer, the index letters, 'a', 'b', and 'c' (or equivalent characters) have been affixed to the percentages of inactive insoluble nitrogen, to indicate the ratios between the active and inactive insoluble in the several samples. Cases in which the active constitutes three-fifths or more of the insoluble are marked 'a'; two-fifths to three-fifths, 'b', and less than two-fifths, 'c.' The New England Stations use the terms 'good,' 'doubtful' and 'poor' for these respective classes of cases.

Of the 276 samples examined this season, 62 belong to class 'a,' 192 to 'b,' and 22 to 'c.'

It is needful to keep clearly in mind the meaning of the index 'c' as thus applied. Its presence does not suffice to indicate that the fertilizer contains no readily available nitrogen, but merely that part or all of the insoluble nitrogen is derived from low-grade sources, barring cases in which cyanamid is one of the fertilizer ingredients. These low-grade materials may be such as are listed in Section 4 of the law, or others in common use, such as garbage tankage, peat or mora meal; and they may, if of animal origin, have had their nitrogenous materials changed almost entirely to an available condition by 'wet mixing,' which has, however, little improving effect upon the nitrogenous constituents of garbage tankage and mora meal, and little more upon those of peat.

The use of such low-grade materials is either to make the fertilizer less likely to become sticky or lumpy, or to supply nitrogen from

materials that would otherwise be wholly thrown to waste. The use of 'conditioners' for the former purpose is, in itself, desirable rather than objectionable; but becomes obnoxious and unjust when the nitrogen they contain in unavailable form is made the basis of a charge at high rates to the buyer. The use also of low-grade and therefore cheap nitrogen supplies whose nitrogen has, by chemical treatment, been made useful for plant-food, is laudable provided the materials are sold for what they are.

In cases where the inactive insoluble nitrogen forms a large fraction of the total nitrogen, is marked by the index 'c,' the guaranty does not exceed the available nitrogen by an amount equal to most of the 'inactive,' and the selling price, corrected for freight difference, is not considerably less than that asked for fertilizers of like general composition but supplying nitrogen derived from high-grade goods such as bear the index 'a' or even 'b,' there is reason to believe that the buyer is being subjected to unfair treatment.

Section 1 of the Fertilizer Law of 1909 requires that the guaranty for a fertilizer shall state 'the percentage such fertilizer contains of nitrogen in an available form.' It is, however, by no means clear that the term 'available,' as used in the law, means precisely the same thing that is meant by that term when used to designate the sum of the water-soluble and active insoluble nitrogen, as determined by the present method. For some nitrogenous fertilizer ingredients always regarded as of high grade, such as dried blood, meat tankage, and cottonseed meal, contain considerable fractions of inactive insoluble nitrogen when examined by this method. Until further notice, therefore, the law will not be construed to require that the amount of nitrogen guaranteed shall not exceed that present in a form that will appear as 'available' by the alkaline permanganate method now in use.

In many of this season's samples, however, the quantity of nitrogen thus available is found equal to the percentage guaranteed. On the average, the 'available' nitrogen found was 1.59 per cent. the total 1.95, that guaranteed, 1.82 per cent.

ORGANIZATION OF THE WORK.

The work of the season has been performed under my direction as follows:

The nitrogen determinations by Walter Thomas, B. S., and Ralph C. Bathgate, B. S.; the total phosphoric acid, by F. J. Holben, B. S.; the insoluble phosphoric acid and moisture, by H. D. Edmiston

and D. H. Bredt, B. S.; the potash, by E. S. Erb, M. S.; the chlorin, by Chas. Kern; the computations, by M. Verna Bryce and others. G. C. Given, Ph. D., had charge of the reception and preparation of the samples, and immediate supervision of the analytical work. To all of these assistants the writer is indebted for loyal aid.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
2612	ALLENTOWN MANUFACTURING CO., ALLENTOWN, PA. Special Complete Phosphate,	Geo. Ballet, Sweitzer,	8.44
2681	AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK. Allens Special Potato & Truck Manure,....	Harvey Detweiler, Chester Springs, Smith & McKeivley, Blairsville,....	10.70
2697	†Bradley's Special B. D. Guano,	Athens Milling Co., Athens,	7.39
2886	†Bradley's Eclipse Phosphate,	The Eli Zell Co., Greensburg,	9.01
3341	Bradley's Excelsior Compound,	Geo. R. Andrews, Emon Valley,	9.52
3008	Bradley's Half Century Fertilizer,	Thos. McClain, Bellevernon, R. No. 2	10.30
3428	†Bradley's New Method Fertilizer,	A. L. Miller, Edels,	7.69
3920	Bradley's Unicorn,	F. H. Rentschler, Shartselsville,....	8.26
3586	Bradley's Vegetable Fertilizer,	E. G. Kelts, Knoxville,	9.19
3246	Canton Chemical Eagle Phosphate,	Jas. Robbins, Benton,	9.51
3277	†Canton Chemical Special Potato and Vegetable Manure,	Wysox Coal & Hay Co., Wysox, ..	8.26
3012	Canton Chemical Special Resurgam Guano,	J. V. Lawrence, Nichols,	9.19
3146	†Canton Chemical Baker's Special Wheat, Corn and Grass Mixture,	R. W. Beardslee, Little Meadows, ..	9.51
3363	Special Complete Manure for Top Dressing	A. H. Keeley & Sons, Schwencks-ville, ..	7.24
2574	Crocker's Ammoniated Super Phosphate,....	King Bros., Uniontown,	8.55
2811	Crocker's Special Anchor Brand,	Jno. B. Buckman, Newton,	7.51
2028	†Crocker's Special Complete Manure,	H. F. Gump & Son, Everett,	13.70
3145	Crocker's Special Colonial Fertilizer,	C. H. Neefe, Condersport,	8.48
3052	†Crocker's General Crop Fertilizer,	Harry Keefe, Pine Grove,	7.49
2067	Crocker's Harvest Jewel Fertilizer,	John R. Buckman, Newtown,	8.18
2066	Crocker's Potato, Hop & Tobacco Fertilizer,	F. H. Shenberger, Red Lion, R. D. No. 1, ..	9.14
2022	†Crocker's Universal Grain Grower,	T. R. Bolton, Cochranston,	5.56
2310	Crocker's Wheat & Corn Fertilizer,	T. R. Bolton, Cochranston,	8.01
2024	†East India Economizer Phosphate,	Jas. Herb, Pittman, R. D.,	7.16
2809	East India Special Garden and Farm Ma- nure,	Farmer's Supply Co., Milan,	8.16
2090	East India Hawk Eye Fertilizer,	Jas. Herb, Pittman, R. D.,	5.68
2827	East India Unexcelled Fertilizer,	W. C. White, Condersport,	8.73
2309	†Great Eastern Revised General,	Union City Coal and Supply Co., Union City, ..	9.58
2808	Great Eastern Revised Northern Corn Special,	S. T. & I. W. Gibson, Indiana,	7.05
2922	Great Eastern Special Crop Fertilizer,	Farmers' Supply Co., Milan,	9.58
2776	†Great Eastern Vegetable, Vine and To- bacco Fertilizer,	W. C. White, Condersport,	10.32
2634	†Detrick's Corn and Oats Fertilizer,	Houck & Henry, New Berlinville, ..	7.19
2890	†Detrick's Kangaroo Komplete Kom-pound,	W. B. Leete, Ulysses,	5.11
2683	†Detrick's Special Standard Potash Fer- tilizer,	Hartwell & Phillips, New Wilming- ton, ..	7.01
2891		J. E. Watters, Jamestown,	9.28
		Theodore Gerhart, Gilberts,	9.12
		John & Bitler, Catawissa, R. D., ..	
		C. M. Honeywell, Dallas,	
		Theodore Gerhart, Gilberts,	
		Jacob Heck's Sons, Kress,	
		Alcorn & Poole, Titusville,	
		H. F. Fausnoll, Mt. Pleasant,	
		Wm. J. Johnston, Sinking Spring, ..	
		Wm. J. Johnston, Sinking Spring, ..	
		Alcorn Poole, Titusville,	
		Wm. J. Johnston, Sinking Spring, ..	
		Nickles & Stewart, Shippensburg, ..	
		Levi Berkey, Somerset,	
		W. S. Leeper, Mt. Pleasant,	
		Mowry-Latshaw H'd'w. Co., Spring City, ..	
		W. S. Leeper, Mt. Pleasant,	
		Phil Yost, McEwensville,	
		Newton Gonder, Bosswell,	
		Levi Berkey, Somerset,	
		W. S. Leeper, Mt. Pleasant,	

†Composite Sample.

*Constituents falls below guaranty.

FERTILIZERS.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs. at point of selection.
Available.		Insoluble.	Total.		Present as Muriate.	Present as Sulphate.	Total.		Water Soluble.	Available.	Inactive Insoluble.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
5.15	5.00	5.80	10.95	10.00	.21	.....	.21	.....	.43	1.25	\$1.19	2.44	9.25	23.40	23.00
8.89	8.00	1.14	10.03	9.00	3.33	.....	3.33	3.00	1.89	2.13	\$1.23	2.41	2.47	30.75	29.00
10.91	8.00	1.43	12.33	9.00	3.21	.....	3.21	3.00	.65	.83	\$1.29	1.08	.82	26.41	26.00
8.25	8.00	1.15	9.41	9.00	3.39	.....	3.39	3.00	.82	1.05	\$1.25	1.31	1.08	22.30	21.00
9.67	9.00	1.25	10.98	10.00	3.23	.....	3.23	3.00	.78	.90	\$1.15	1.05	.82	25.23	24.00
8.62	8.00	1.41	10.03	9.00	3.16	.....	3.16	3.00	1.44	1.33	\$1.32	2.20	2.05	29.23	26.00
8.27	8.00	1.02	9.29	9.00	2.10	.....	2.10	2.00	.43	.66	\$1.30	.96	.82	20.97	21.50
8.17	8.00	1.20	9.47	9.00	2.02	.....	2.02	2.00	1.00	1.29	\$1.33	1.62	1.05	23.72	22.00
10.17	10.00	1.23	11.45	11.00	3.57	.....	3.57	3.00	2.47	3.13	\$1.37	3.50	3.29	27.33	26.00
7.77	7.00	1.15	8.92	8.00	1.23	.....	1.23	1.00	.76	.89	\$1.16	1.05	.82	19.38	21.00
7.88	8.00	1.07	9.55	9.00	3.17	.....	3.17	3.00	1.16	1.33	\$1.13	1.51	1.23	25.58	22.00
8.72	8.00	.99	9.71	9.00	3.41	.....	3.41	3.00	.69	.81	\$1.13	.94	.82	28.98	25.00
*8.24	9.00	1.33	10.17	10.00	1.81	.....	1.81	2.00	.82	.99	\$1.16	1.15	.82	21.66	21.50
7.42	7.00	.94	8.36	8.00	3.12	.....	3.12	3.00	3.69	4.37	\$1.36	*4.73	4.94	39.56	36.00
8.89	9.00	1.63	10.52	10.00	2.64	.....	2.64	2.00	3.19	2.45	\$1.24	2.89	2.47	30.38	28.00
*9.16	10.00	2.14	11.30	11.00	3.04	.....	3.04	3.00	1.04	1.42	\$1.20	1.62	1.05	27.19	27.50
8.63	8.00	1.31	9.94	9.00	3.27	.....	3.27	3.00	.70	.91	\$1.26	1.11	.82	24.48	23.00
10.58	10.00	1.33	11.91	11.00	3.26	.....	3.26	3.00	1.99	2.64	\$1.36	3.00	2.47	34.88	27.75
7.00	7.00	1.47	8.56	8.00	1.16	.....	1.16	1.00	.60	.85	\$1.16	1.01	.82	13.40	19.00
8.10	8.00	1.35	10.05	9.00	2.37	.....	2.37	2.00	1.08	1.41	\$1.30	1.71	1.05	25.13	22.00
8.21	8.00	1.63	9.89	9.00	3.32	.....	3.32	3.00	1.75	2.17	\$1.13	2.30	2.06	29.82	26.00
8.45	8.00	.96	9.41	9.00	3.04	.....	3.04	2.00	.57	.73	\$1.20	.92	.82	20.78	20.45
*7.28	8.00	1.50	*8.78	9.00	1.65	.....	1.65	1.50	1.63	1.80	\$1.22	2.12	2.06	24.60	22.00
7.98	8.00	1.59	9.57	9.00	3.13	.....	3.13	2.00	.51	.83	\$1.37	1.10	.82	21.67	22.00
*8.84	10.00	1.15	*9.99	11.00	3.24	.....	3.24	3.00	1.41	1.92	\$1.35	*2.27	3.29	39.82	19.50
7.64	7.00	1.23	8.92	8.00	1.67	.....	1.67	1.00	.81	.56	\$1.64	1.20	.83	30.73	18.00
8.19	8.00	1.56	9.75	9.00	3.13	.....	3.13	3.00	1.84	1.33	\$1.27	2.30	2.06	26.99	30.00
8.21	8.00	1.53	9.74	9.00	3.06	.....	3.06	3.00	.59	.73	\$1.13	.96	.82	21.04	21.75
8.46	8.00	1.09	9.55	9.00	2.10	.....	2.10	1.50	1.39	1.77	\$1.23	2.05	2.06	25.17	24.00
8.39	8.00	.96	9.37	9.00	3.23	.....	3.23	3.00	.65	.77	\$1.15	.93	.82	23.71	22.00
8.41	8.00	1.63	10.03	9.00	3.24	.....	3.24	3.00	1.67	1.99	\$1.27	2.25	2.06	29.77	27.50
9.08	9.00	1.43	10.51	10.00	3.13	.....	3.13	3.00	.61	.75	\$1.14	.91	.82	23.90	22.00
8.15	8.00	1.47	9.62	9.00	3.24	.....	3.24	3.00	1.35	1.60	\$1.19	1.79	1.65	27.27	27.00
8.26	8.00	1.23	9.54	9.00	3.22	.....	3.22	3.00	.98	1.11	\$1.15	1.26	1.23	24.83	23.00
															22.50
															24.00
															26.00

Characters indicating the proportion of insoluble nitrogen that is inactive: $\frac{1}{5}$ —two-fifths or less; $\frac{2}{5}$ —two-fifths to three-fifths; $\frac{3}{5}$ —three-fifths or more.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
AMERICAN AGRICULTURAL CHEMICAL CO.—Continued.			
2291	High Grade Crop Producer,	J. V. Lawrence, Nichols, N. Y., R. No. 1,	9.49
2268	{ Maryland O. K. Ammoniated Fertilizer, ...	E. S. Minnich, Brillhorts,	9.52
2015		S. W. Heim, Pitman, R. D.,	
2178		Paxton Flour & Feed Co., Bowmansdale,	
2109		Sam'l Hummel, Monterey,	
2384	{ Maryland Revised Special Compound for Potatoes and Tobacco,	Sam'l Fackler, Harrisburg,	9.08
2086	{ Michigan Carbon Works General Crop Fertilizer Special,	Davis & Hyde, Spartanburg,	6.24
2257	{ Millsom's Special Buffalo Guano,	N. H. Long, Greensburg, R. No. 3,	4.85
2252	{ Millsom's Corn Fertilizer,	Graham Bros., Darlington,	7.09
2257		Lake Shore Fruit Co., North East,	
2415		J. W. Eberts, Clearfield,	
2258		N. H. Long, Greensburg, R. No. 3,	
2539	{ Millsom's Special Soil Enricher,	Lake Shore Fruit Co., North East,	2.09
2472	{ Millsom's Truck Fertilizer,	D. B. Stein, Orwigsburg,	
2538		Lake Shore Fruit Co., North East,	
2732		D. W. Wagner, Easton,	
2916	{ Millsom's Wheat, Oats and Barley,	Morris Reeser, West Leesport,	7.52
2416		J. W. Eberts, Clearfield,	
2331		Sam. F. McQuiston, Meadville, ...	
2082		R. W. Daub, Mulr,	
2694	{ Moro Phillips Special Farmer's Potato Mixture,	A. M. F. Stiteler, Uwchland,	10.77
2590	{ Moro Phillip's C. & G. Complete Fertilizer,	J. I. Goss, Paintersville,	8.54
2291		A. M. F. Stiteler, Uwchland,	
2089		A. A. Schwalm, Secy., Hegins, ...	
2292		A. M. F. Stiteler, Uwchland,	
2292	{ North Western Special Complete Compound,	Jeff Kalfsalthier, Berlin,	8.54
2433	{ North Western Special Farmers Standard,	J. B. Schuchart, New Freedom, ...	9.12
2232		Kemmer & Co., Lehighton,	
2112		N. R. Yeot, Myerstown,	
2321		Wm. Apuf, Milford,	
2321	{ North Western Special Red Line Fertilizer,	N. R. Yeot, Myerstown,	8.54
2111	{ Odorless Grass and Lawn Top Dresser,	Wm. Apuf, Milford,	6.77
2429		Weeks Hardware, Scranton,	
2103		David Turn, North Water Gap,	
2112		S. A. Detrich, Milford,	10.57
2245	{ Packer's Union Special Animal Corn Fertilizer,	N. H. Blough, Davidsville,	3.36
2104	{ Packer's Union Special Universal Fertilizer,	David Turn, North Water Gap,	7.51
2087		Monroe Savidge, Hegins, R. No. 1,	
2240		Wm. Brown, Mill Creek,	
2180		Paxton Flour & Feed Co., Bowmansdale,	
2158	{ Reese's Ammoniated Phosphate Mixture, ...	Harry Wilson, Fraser,	8.10
2029		Harry Keefer, Pine Grove,	
2625		D. F. Walker, Rockwood, R. No. 2,	
2578		C. H. Hershey, Manheim,	
2159	{ Reese's Special Potato Manure,	Harry Wilson, Fraser,	7.91
2405	{ Reese's Special Potato and Truck Manure,	Mrs. V. A. Martin, Loysville,	7.96
2030		Harry Keefer, Pine Grove,	
2005		W. E. Knorr, Klingerstown, R. D.,	
2179		Paxton Flour and Feed Co., Bowmansdale,	
2008	{ Sharpless & Carpenter's No. Brand Phosphate,	W. E. Knorr, Klingerstown, R. D.,	8.96
2176	{ Sharpless & Carpenter's No. 2, for Grain and Grass,	Hilles & Taggart, Norristown, ...	5.49
2182		Paxton Flour & Feed Co., Bowmansdale,	
2007		W. E. Knorr, Klingerstown, R. D.,	
2471		J. Kunkle & Son, McKeanburg,	
2819	{ Sharpless & Carpenter's Special Fish Guano,	Smith & McKelvey, Blairsville, ...	3.31
2109		Sam'l Hummel, Monterey,	
2823		S. T. & J. W. Gibson, Indiana,	

*Composite Sample.

*Constituents falls below guaranty.

LIZERS—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.				Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs., at point of selection.	
Available.		Insoluble.	Total.		Present as Muriate.	Present as Sulphate.	Total.		Water Soluble.	Available.	Inactive Insoluble.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.			Guaranteed.
10.17	9.00	1.30	11.47	10.00	3.28	.....	3.28	3.00	.81	1.18	\$.35	1.53	1.66	27.96	23.10
8.23	8.00	1.19	9.53	9.00	2.06	.....	2.06	2.00	.77	.89	\$.16	1.05	.82	21.46	17.00 21.00 19.50
10.33	10.00	1.59	11.97	11.00	3.24	.....	3.24	3.00	1.24	1.51	\$.19	1.70	1.66	28.87	26.00
*7.61	8.00	1.06	*8.69	9.00	3.21	.....	3.21	3.00	.60	.76	\$.10	.86	.82	22.17	24.00
8.12	8.00	1.38	9.50	9.00	3.22	.....	3.22	3.00	.48	.68	\$.21	.89	.82	23.00	22.00 23.00
9.55	9.00	2.12	11.67	10.00	2.27	.....	2.27	2.00	1.90	2.40	\$.21	2.61	2.47	30.45	37.01
*7.75	8.00	2.32	10.07	9.00	3.09	.....	3.09	3.00	1.63	1.97	\$.22	2.19	2.06	28.83	24.03 36.50 27.00
7.34	8.00	2.04	9.38	9.00	2.89	.....	2.89	3.00	1.22	1.49	\$.21	1.70	1.66	26.12	24.75 37.00
9.94	10.00	2.04	11.98	11.00	2.93	.....	2.93	3.00	2.54	3.02	\$.37	3.39	3.29	35.86	32.00 28.00
7.83	8.00	1.23	9.06	9.00	2.21	.....	2.21	2.00	.67	.82	\$.20	1.02	.82	21.09	23.00 21.00 22.25
8.86	8.00	1.19	10.05	9.00	3.34	.....	3.34	3.00	1.09	1.23	\$.18	1.50	1.23	26.82	24.00 23.00
7.98	8.00	1.06	9.06	9.00	2.04	.....	2.04	2.00	.63	.76	\$.18	.94	.82	20.69	22.00
8.72	8.00	1.31	10.08	9.00	3.16	.....	3.16	3.00	1.56	1.86	\$.23	2.14	2.06	29.13	22.00 22.00
8.54	8.00	.98	9.52	9.00	2.94	.....	2.94	3.00	.75	.87	\$.11	.98	.82	23.16	19.00
8.03	8.00	1.28	9.31	9.00	3.30	.....	3.30	3.00	.75	\$.86	\$.14	1.00	.82	23.64	21.50 19.00
8.33	8.00	1.87	10.20	9.00	3.16	.....	3.16	3.00	.95	1.17	\$.18	1.35	1.23	25.39	19.00
10.50	10.00	1.47	11.97	11.00	3.09	.....	3.09	3.00	2.28	2.85	\$.26	3.21	3.29	35.47	32.00 31.00 22.00
8.93	8.00	1.17	10.10	9.00	3.75	.....	3.75	3.00	1.35	1.97	\$.40	2.37	2.47	31.38	26.00 23.50 21.00
5.37	5.00	.70	6.07	6.00	3.34	.....	3.34	3.00	2.79	3.42	\$.31	3.73	3.91	31.45	33.50
10.20	10.00	1.59	11.79	11.00	3.07	.....	3.07	3.00	1.66	2.06	\$.34	2.40	2.47	31.53	26.50
10.24	10.00	1.59	11.83	11.00	2.50	.....	2.50	2.00	.95	1.30	\$.30	1.60	1.65	28.79	28.50
8.00	8.00	1.68	9.68	9.00	3.36	.....	3.36	3.00	1.52	1.90	\$.28	2.19	2.06	29.29	26.00 23.50 21.00
8.62	8.00	1.17	9.79	9.00	2.18	.....	2.18	2.00	.76	.88	\$.11	.99	.82	21.79	21.00
8.12	8.00	1.40	9.52	9.00	2.46	.....	2.46	2.00	.88	1.00	\$.17	1.17	1.06	22.62	20.00
9.37	9.00	1.15	10.52	10.00	3.38	.....	3.38	3.00	.68	.81	\$.14	.95	.82	24.63	25.00 24.00 21.00
8.91	8.00	1.21	10.12	9.00	2.58	.....	2.58	2.00	1.21	1.47	\$.19	1.66	1.65	25.82	24.03
8.57	8.00	1.18	9.75	9.00	3.34	.....	3.34	3.00	1.09	1.23	\$.10	1.33	1.23	25.39	25.00 30.00 26.00
8.46	8.00	1.37	9.83	9.00	3.49	.....	3.49	3.00	1.72	2.15	\$.26	2.41	2.06	30.76	26.00
8.72	8.00	1.06	9.39	9.00	3.16	.....	3.16	3.00	.78	.88	\$.12	1.00	.82	23.76	20.50 21.01 23.00
8.63	8.00	1.02	9.65	9.00	2.74	.....	2.74	2.00	1.15	1.43	\$.30	1.73	1.65	26.26	27.00 25.00 18.00
7.49	7.00	1.08	8.57	8.00	1.49	.....	1.49	1.00	.74	.83	\$.14	.97	.82	19.05	18.00
10.46	9.00	1.39	11.85	10.00	3.00	.....	3.00	3.00	1.11	1.37	\$.30	1.67	1.65	28.12	26.00
8.48	8.00	1.24	9.72	9.00	3.32	.....	3.32	3.00	1.44	1.81	\$.28	2.07	2.06	28.92	26.00
8.29	8.00	1.23	9.57	9.00	2.96	.....	2.96	3.00	.95	1.17	\$.19	1.36	1.23	24.66	26.00 27.00 27.00

† Characters indicating the proportion of insoluble nitrogen that is inactive: †=two-fifths or less; ‡=two-fifths to three-fifths; §=three-fifths or more.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
AMERICAN AGRICULTURAL CHEMICAL CO.—Continued.			
2175	Sharpless & Carpenter's Revised Soluble Tampico Guano.	Hilles & Taggart, Norristown,	7.43
2377	Special Potash Mixture for Potatoes,	S. A. Fishburn, Penbrook,	5.91
2481	†Susquehanna Ammoniated Phosphate, ...	Wm. Weaver, Bethlehem, R. No. 3,	8.06
2122		Amos K. Stoltzfus, Elverson,	
2644	†Susquehanna Revised Special Potato and Tobacco Manure.	Woy & Saylor, Somerset,	9.79
2699		E. C. Tyson, Flora Dale,	
2643	†Susquehanna Special Potato Phosphate, ...	Woy & Saylor, Somerset,	9.41
2752		Henry Moyer, Campbelltown,	
2390	Tygert Allen's Standard Brand Phosphate.	Wm. Weaver, Bethlehem, R. No. 3,	8.25
3168		A. H. Keeley & Sons, Schwencks-ville	
3183	†Tygert Allen's Star Brand Phosphate, ...	Paxton Flour & Feed Co., Bowmans- dale.	8.25
2633	Tygert Allen's Special Star Potato Grower, Williams & Clark's Americus Potato Ma- nure.	Harvey Detweiler, Chester Springs,	7.96
3051		F. H. Shenberger, Red Lion, R. D. No. 1.	
2680	†Williams & Clark's Special Elk Brand,...	Harvey Detweiler, Chester Springs,	2.10
3120		David Werner, Nazareth, R. No. 2,	7.64
2295	Williams & Clark's Special Good Grower,...	Jacob Rush, Plumsteadville,	8.81
2298		C. E. Drake, Athens,	
2294	Williams & Clark's Matchless Fertiliser,...	Jacob Rush, Plumsteadville,	12.53
3199		Hervey J. Thels, Germania,	
2728	Williams & Clark's Prolific Fertiliser,...	W. H. Best, Mecada,	8.63
2733		Stewart Weaver, Easton,	8.17
3119	Williams & Clark's Utility Brand,	R. Milhelm, Nazareth R. No. 2, ..	7.62
2085		Alcorn & Poole, Titusville,	9.75
2294	†Wheeler's High Grade Vegetable Manure,...	Geo. Decker, Athens,	9.21
2551		W. S. Ickes, Reynoldsville,	
3373	†Zell's Economiser Phosphate,	O. F. Arnold, Dillsburg, R. No. 1,	7.62
2447		Treasler Schlegel Co., Red Cross,	
3329	Zell's Hustler Phosphate,	B. F. Harting, Newport,	10.63
3355		Geo. B. Murphy, Red Lion, R. No. 1	
3371	Zell's Revised Special Compound for Po- tatoes and Vegetable.	O. F. Arnold, Dillsburg, R. No. 1,	4.04
AMERICAN FERTILIZER CO., BALTIMORE MD.			
3561	American Emergency Special Compound Guano.	Jones Eavenson, Christiansa,	8.01
2254	†American Fish and Bone Compound,....	N. H. Blough, Davidville,	12.21
2639		J. G. Emert, Somerset,	11.10
2379	†American Grain & Grass Grower,	R. B. Hyson, Bridgeton,	
AMERICAN REDUCTION CO., PITTSBURGH, PA.			
3005	Common Sense,	J. J. Briabine, Madison,	6.97
ARMOUR FERTILIZER WORKS, BALTI-MORE.			
3323	Ammoniated Phos. and Potash Fertiliser, ...	J. F. Chisholm, McKean,	6.65
2475	†Corn and Grain Champion,	Fritz Bros., Garrett,	7.25
2381		S. G. Updegraff, Williamsport, ..	
2586	†Crop Grower,	Jacob Bowser, St. Clairsville,	7.54
2473		Fritz Bros., Garrett,	
3379	†Armour's (5-5-3),	S. G. Updegraff, Williamsport, ..	3.41
2622		J. Singmaster & Co., Macungie, ..	
2902	†Armour's (4-3-3),	Manasfeld Bros., Coudersport,	7.91
2076		S. S. Bryan, Titusville,	
3135	†Armour's Grain Grower,	F. E. Bailey, Northbrook,	5.82
3216		R. A. DeCoursey, Liberty,	
3307	†Armour's (3-3-3),	W. S. Buckman, Hatboro,	6.18
2146		S. K. Chambers & Bro., West Grove,	
2078	†Armour's (3-3-3),	S. S. Bryan, Titusville,	6.18
2195		Geo. W. Holsinger, Red Lion,	
2623	†Armour's (3-3-3),	J. Singmaster & Co., Macungie,	6.18
7145		S. K. Chambers & Bro., West Grove,	
2897	†Composite Sample.	Louck's H'dw. Co., Scottsdale,	

†Composite Sample.

*Constituents falls below guaranty.

FIZERS—Continued

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs., at point of selection.
Available.		Insoluble.	Total.		Present as Muriate.	Present as Sulphate.	Total.		Water Soluble.	Available.	Inactive Insoluble.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
10.57	10.00	1.48	12.05	11.00	3.52	.....	3.52	3.00	2.37	3.08	1.41	3.49	3.29	27.71	35.00
6.48	6.00	1.08	7.51	7.00	3.09	.....	3.09	3.00	1.34	1.60	1.20	1.80	1.65	25.34	23.00
8.70	8.00	1.08	9.78	9.00	2.48	.....	2.48	2.00	1.28	1.57	1.23	1.80	1.65	26.03	23.00
*8.79	9.00	1.47	10.26	10.00	2.93	.....	2.93	3.00	1.33	1.51	1.20	1.71	1.65	26.79	23.75
8.37	8.00	1.22	9.59	9.00	3.47	.....	3.47	3.00	1.66	1.90	1.26	2.16	2.06	29.36	26.00
8.64	8.00	1.43	10.07	9.00	2.00	.....	2.00	2.00	1.41	1.60	1.18	1.78	1.65	25.15	25.00
8.34	8.00	1.21	9.55	9.00	2.89	.....	2.89	3.00	1.65	1.98	1.23	2.21	2.06	28.44	25.00
9.17	8.00	.99	10.16	9.00	3.54	.....	3.54	3.00	1.02	1.28	1.26	1.52	1.23	27.20	25.00
8.61	8.00	1.24	9.85	9.00	3.21	.....	3.21	3.00	1.08	1.62	1.38	2.00	2.06	28.39	25.00
8.78	8.00	1.50	10.28	9.00	3.20	.....	3.22	3.00	.68	.84	1.16	1.00	.82	24.28	24.00
7.94	8.00	1.75	9.69	9.00	3.54	.....	3.54	3.00	.97	1.21	1.13	1.39	1.23	26.02	25.00
8.47	8.00	1.03	9.50	9.00	2.50	.....	2.50	2.00	1.00	1.54	.39	1.93	1.65	26.50	23.00
7.32	7.00	1.77	9.09	8.00	1.33	.....	1.32	1.00	.62	.85	.19	1.04	.82	19.29	25.00
10.29	10.00	.92	11.21	11.00	3.12	.....	3.12	3.00	2.43	3.12	2.39	3.51	3.29	36.39	30.00
*9.63	10.00	1.94	11.57	11.00	3.01	.....	3.01	3.00	1.28	1.70	2.14	1.84	1.65	28.56	27.50
9.23	8.00	.98	10.21	9.00	2.91	.....	2.91	3.00	1.45	1.78	1.27	2.00	2.06	28.20	26.00
3.55	8.00	1.21	9.76	9.00	2.11	.....	2.11	2.00	.68	.79	1.19	.96	.82	21.51	21.00
9.12	9.00	.99	10.11	10.00	3.00	.....	3.00	3.00	.79	1.00	1.13	1.13	.82	24.44	21.00
8.90	8.00	1.21	10.11	9.00	3.45	.....	3.45	3.00	2.08	2.40	1.24	2.64	2.47	32.12	27.00
6.91	7.00	.94	7.85	8.00	1.35	.....	1.35	1.00	.49	.....	.....	.63	.41	16.57	15.00
8.65	8.00	1.57	10.22	9.00	3.92	.....	3.92	3.00	.89	1.34	1.44	1.78	1.65	29.10	28.00
9.22	9.00	1.33	10.65	10.00	3.51	.....	3.51	3.00	.66	.76	1.16	.92	.82	24.67	22.50
7.92	7.00	.98	8.85	8.00	1.53	.....	1.53	1.00	.66	1.06	1.57	1.63	1.23	22.66	22.00
9.55	9.00	.68	10.23	9.50	2.85	.....	2.85	3.00	.34	.61	1.25	.96	.82	23.25	24.00
9.17	9.00	.89	10.06	9.50	3.09	.....	3.09	3.00	.79	1.20	1.47	1.67	1.65	26.91	28.00
*7.73	8.00	.87	8.80	8.50	2.00	.....	2.00	2.00	.42	.62	1.26	.83	.82	19.96	24.00
8.43	8.00	1.24	9.33	8.50	3.16	.....	3.16	3.00	.45	1.11	1.56	*3.67	4.11	35.73	40.00
8.39	8.00	.89	9.28	8.50	2.69	.....	*2.69	3.00	1.77	2.59	1.61	3.20	3.29	32.49	30.00
8.55	8.00	1.15	9.70	8.50	2.15	.....	2.15	2.00	.61	1.00	1.40	1.49	1.65	23.88	23.00
8.59	8.00	.89	9.48	8.50	3.33	.....	3.33	3.00	1.43	1.99	1.57	2.56	2.47	31.14	26.00
															24.00

* Characters indicating the proportion of insoluble nitrogen that is inactive. †=2.5 or less; ‡=2.5 to 3.5; §=3.5 or more.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
ARMOUR'S FERTILIZER WORKS, BALTIMORE, MD.—Continued.			
2977	Armour's (2-8-3),	S. S. Bryan, Titusville,	2.96
3431	Armour's (2-8-3),	Geo. E. Thompson, Chatham Run, ..	7.05
2324	Armour's (7-6-3),	J. Singmaster & Co., Macungie, ...	7.52
2320	†Wheat, Corn and Oat Special,	S. G. Updegraff, Williamsport, ...	
2633		H. C. Beerits Sons, Somerset,	
ATLANTIC FERTILIZER WORKS, BALTIMORE, MD.			
2297	Atlantic Blood, Bone, Fish and Potash, ..	O. E. Drake, Athens,	6.52
3413	Atlantic Corn, Wheat and Oats Special, ..	Cove Lumber Co., Marysville,	7.42
3048	Atlantic Gold Medal Superior for all Crops, ..	Grove & Uffelman, Parke,	6.51
2275	Atlantic Standard Compound,	Hill & Walker, Shanksville,	7.96
R. S. AUCKER, SHAMOKIN, PA.			
3000	Economy Potash Phosphate,	Geo. R. Hendricks & Son, Selinsgrove, ..	7.42
2999	Grade B. Bone and Slaughter House Phosphate, ..	Geo. R. Hendricks & Son, Selinsgrove, ..	8.59
3001	Grade D, Bone and Slaughter House Phosphate, ..	Geo. R. Hendricks & Son, Selinsgrove, ..	6.65
BALTIMORE FERTILIZER CO., BALTIMORE, MD.			
2208	Honest Potato Grower,	Adam Shenberger, Dallastown,	4.11
BALTIMORE PULVERIZING CO., BALTIMORE, MD.			
2329	High Grade Potato Guano,	J. L. Royer, Myerstown, R. No. 4, ..	7.23
2328	Practical Fertilizer,	J. L. Royer, Myerstown, R. No. 4, ..	6.99
2327	Royal Compound,	J. L. Royer, Myerstown, R. No. 4, ..	9.05
2331	Truckers Choice,	J. L. Royer, Myerstown, R. No. 4, ..	7.84
BAUGH & SONS CO., PHILADELPHIA, PA.			
2405		R. S. Forman, Center Hall,	7.72
2149	†Baugh's Animal Base and Potash Compound for all Crops, ..	Edw. Brinton & Sons, West Chester, ..	
2970		W. E. Monifold, Fawn Grove,	9.29
2971	†Baugh's Combination Animal Base Fertilizer, ..	John W. Eby, Zion,	
2631		T. K. George, Homer City,	10.33
2640		Jas. Fulton & Sons Co., Stewartstown, ..	
2160		Henry Palmer, Langhorne,	8.33
2013	†Baugh's Complete Animal Base Fertilizer, ..	W. W. Haas, Pitman, R. D.,	
2394		Edwards E'd'w. Co., Ebensburg, ..	7.42
2138	†Baugh's Excelsior Guano,	Jas. G. Kauffman, Dauberville, ..	
2014		W. W. Haas, Pitman, R. D.,	3.53
2163		Henry Palmer, Langhorne,	
2371	Baugh's High Grade Ammoniated Animal Base, ..	Francis Baker, Everett,	3.53
3310		Wm. Hobensack, Ivyland,	
2102	†Baugh's High Grade Potato Grower (Big Potato Brand), ..	Sam'l R. Wenger, Bareville, R. No. 1, ..	3.96
2604	Baugh's Highly Improved Tobacco Culture Manure, ..	Theo. Gangewere, Curryville,	
2104		Sam'l R. Wenger, Bareville, R. No. 1, ..	6.99
2344	†Baugh's Peninsula Grain Producer,	W. H. Blough, Davidsville,	
2004		C. G. Updegraff, Sacramento,	3.26
2349	†Baugh's Peruvian Guano Substituted for Potatoes and all Vegetables, ..	John F. Stier, Johnsonville,	
2140		Jas. G. Kauffman, Dauberville, ..	9.45
2508		Theo. Gangewere, Curryville,	
2251	†Baugh's Potato and Truck Special for all Truck Crops, ..	N. H. Blough, Davidsville,	4.27
2410	Baugh's Pure Bone and Potash Mixture, ..	Edw. Brinton & Sons, West Chester, ..	
2409		Rautch & Swartle, Clearfield,	10.71
2119	†Baugh's Special Potato Manure,	L. A. Geiger, Joanna,	
2001		C. G. Updegraff, Sacramento,	4.18
2150	The Wrapper Leaf Brand, a Special Manure for Seedleaf Tobacco, ..	Edw. Brinton & Sons, West Chester, ..	
2337		M. S. Graybill & Son, Bareville,	

†Composite Sample.

*Constituents falls below guaranty.

LIZERS—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.					Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs., at point of selection.
Available.		Insoluble.	Total.		Present as Muriate.	Present as Sulphate.	Total.		Water Soluble.	Available.	Inactive Insoluble.	Total.				
Pound.	Guaranteed.		Pound.	Guaranteed.			Pound.	Guaranteed.				Pound.	Guaranteed.			
7.30	8.00	8.31	10.61	8.50	3.00	.....	3.00	3.00	.75	1.23	1.39	1.61	1.65	25.98	30.00
6.63	6.00	.87	7.50	6.50	.12	3.46	3.53	3.00	3.35	5.30	1.50	5.70	5.78	44.97	36.00	
7.01	7.00	.00	7.67	7.50	1.05	.....	1.05	1.00	.40	.63	1.29	.91	.83	17.36	19.00
7.53	8.00	1.70	9.23	.....	3.13	.....	3.13	3.00	1.31	1.32	1.64	2.48	2.47	29.55	26.00
9.37	11.00	1.33	10.70	.....	2.65	.....	2.65	3.00	.87	.70	.97	.97	.83	35.24	22.55
8.20	8.00	1.25	9.45	.....	2.53	.....	2.53	3.00	1.05	1.38	.97	1.60	1.08	28.92	22.55
8.08	8.00	1.02	9.08	.....	2.09	.....	2.09	3.00	1.08	1.19	1.43	1.61	1.05	23.73	22.00
8.08	8.00	1.53	9.56	.....	1.57	.....	1.57	1.00	.55	.71	1.11	.83	.41	19.20	.....
7.98	8.00	1.40	9.33	.....	3.08	.....	3.08	3.00	1.51	1.68	1.13	1.36	1.05	26.80	.....
7.98	8.00	1.45	9.43	.....	1.46	.....	1.46	1.00	.80	.96	1.13	1.09	.82	20.28	.....
6.91	6.00	.47	7.38	7.00	3.23	.....	3.23	3.00	1.27	1.43	1.33	1.74	1.00	25.36	24.00
8.47	8.00	1.14	9.61	.....	3.13	.....	3.13	3.00	.96	1.34	1.36	1.60	1.64	23.29	24.00
8.43	8.00	1.31	9.73	.....	3.39	.....	3.39	3.00	.35	1.50	1.39	.89	.83	21.33	18.00
9.09	8.00	.73	9.87	.....	1.91	.....	1.91	3.00	1.08	1.37	1.29	1.56	1.64	23.90	22.00
3.68	8.00	1.13	9.30	.....	3.05	.....	3.05	1.50	1.53	1.35	1.33	2.35	2.48	23.94	20.50
8.01	8.00	1.78	9.79	.....	2.31	.....	2.31	3.00	1.05	1.56	1.31	1.87	1.05	26.61	25.00
10.23	10.00	1.69	12.02	.....	3.43	.....	3.43	3.00	.99	1.33	1.33	1.71	1.65	29.30	28.00
11.14	10.00	1.44	12.58	.....	3.56	.....	3.56	3.00	1.27	1.00	1.94	1.94	1.65	29.23	28.00
10.39	10.00	2.50	12.89	.....	4.19	.....	4.19	3.00	.71	1.01	1.94	1.35	1.00	29.63	27.00
11.57	10.00	.96	12.53	.....	.53	.44	.97	.....	2.56	2.84	1.30	3.13	3.30	31.71	28.00
8.53	8.00	1.08	10.30	.....	3.23	.....	3.23	3.00	2.73	3.10	1.37	3.47	3.30	35.24	34.00
6.59	5.00	.90	7.49	.....	1.47	1.16	*2.63	3.00	4.44	4.33	1.45	*5.33	5.78	40.36	35.00
9.55	9.00	1.75	11.30	.....	3.05	.....	3.05	3.00	.57	.78	1.40	1.18	.82	25.53	21.00
*7.68	8.00	3.72	11.40	.....	3.57	.....	3.57	3.00	3.11	3.75	1.41	4.16	4.12	39.26	21.00
10.34	10.00	1.31	11.55	.....	.11	3.15	3.26	3.00	1.33	2.55	1.44	2.99	2.83	35.33	31.00
8.47	.....	7.37	16.34	15.00	3.06	.....	3.06	3.00	.90	2.06	1.90	2.36	2.47	35.05	35.00
10.91	10.00	1.43	12.34	.....	3.46	.....	3.46	3.00	1.27	1.40	1.34	1.83	1.65	30.33	25.00
4.83	2.50	2.49	7.37	.....	.07	3.11	3.13	3.00	2.44	2.83	1.46	3.30	3.30	32.31	27.00

‡‡ Characters indicating the proportion of insoluble nitrogen that is inactive: ‡—two-fifths or less; ‡—two-fifths to three-fifths; ‡—three-fifths or more.

Sample number.	Manufactures and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
2188	THE BERG CO., PHILADELPHIA, PA.		
2169	Berg's High Grade Potato Manure,	Edw. F. Bracken, Paoli,	8.77
	Berg's Standard Bone Manure,	L. W. Danenbower, Southampton, ..	7.37
2497	BERGER BROS., EASTON, PA.		
2784	Farmer's Favorite,	John S. Osterbrook, Easton,	6.37
	Potato & Truck Specials,	John Kuntzman, Easton,	
	BOWKER FERTILIZER CO., NEW YORK CITY.		
2684		Harvey L. Moses, Chester Springs, ..	
2074	†Bowker's Farm and Garden Phosphate, ..	Kernochan & Co., Titusville,	7.62
2719		M. P. Whittington, Bloomsburg,	
3571	Bowker's Special Ideal Potash Compound, ..	H. K. Millinger, Rowenna,	9.40
2075	†Bowker's Lawn and Garden Dressing, Re- vised,	Kernochan & Co., Titusville,	6.24
2801		Youngwood Lumber and Supply Co., Youngwood,	
2899		Youngwood Lumber and Supply Co., Youngwood,	5.11
3217	†Bowker's Potash Fertilizer,	R. A. DeCoursey, Liberty,	
2512		Walter Pierce, E. Smithfield,	
2053	†Bowker's Potash or Staple Phosphate, ..	Jan. E. Wheeling, Cochran, R. D., D.,	6.62
2889		J. D. Porch, Mt. Pleasant,	
2792		L. F. Harris, 2115 N. 2d St., Har- risburg, Pa.,	7.36
2060	†Bowker's Special Potato and Vegetable Fertilizer,	Jan. E. Wheeling, Cochran, R. D., D.,	
3076		M. M. Harter, Nescopeck,	
2791	†Bowker's Special Crop Grower, Revised, ..	L. F. Harris, 2115 N. 2d St., Har- risburg,	8.26
2704		M. H. Hamilton, Ulysses,	8.95
3231	Stockbridge Special No. 1,	P. L. Touhey, Little Meadows,	7.87
3447	Stockbridge Special No. 2,	Murray & Co., Honesdale,	
2883	S. B. BRODBECK, BRODBECKS, PA.		
3030	Brodbeck's Reliable,	S. B. Brodbeck, Brodbeck's,	2.72
	Brodbeck's Standard Crop Producer,	S. B. Brodbeck, Brodbeck's,	11.11
	CENT. CHEM. CO. THOMAS FERTILIZER WORKS, HAGERSTOWN, MD.		
2692		Biglerville Warehouse Co., Bigler- ville,	
2971	†C. C. C. Atlas,	H. J. Cline, Salladasburg,	8.30
2841		Swank Bros., Somerset,	
2870		H. J. Cline, Salladasburg,	
2869	†C. C. C. Bone Mixture,	Geo. Barkman, Shanksville,	6.87
2866		John Klingner, State College,	
2707		W. H. Diehl, Northumberland, E. No. 1,	
2044	†C. C. C. Early Crop Special,	S. K. Savidge, Valley View,	9.06
3440		J. J. Gerhart, Weatherly,	
2462		Rind Bros., Meyersdale R. No. 1, ..	
2045	†C. C. C. Empire,	S. K. Savidge, Valley View,	8.44
2785		E. W. Rupp, Shiremanstown,	
3438	C. C. C. Excelsior,	J. J. Gerhart, Weatherly,	7.63
2210	C. C. C. Golden Sheaf,	H. W. Burk, East Prospect,	7.94
2042	C. C. C. Special,	S. K. Savidge, Valley View,	6.73
	COE MORTIMER CO., NEW YORK.		
2464	E. Frank Coe's Corn King (Special),	P. C. Miller, Meyersdale,	9.20
2801	†E. Frank Coe's Columbian Corn & Potato Fertilizer (Special),	P. C. Miller, Meyersdale,	
2484		C. J. Eberbrook, Runnimerfield, R. D., F. E. Kuntzman, Hellertown, E. No. 1,	9.76
3160		John W. Root, Kimberton,	
2824	†E. Frank Coe's Gold Brand Excelsior Guano (Special),	Geo. J. New, Blairsville,	9.39
3323		Tucker & Souire, Springboro,	
2482	E. Frank Coe's Onondaga Special,	T. F. Kuntzman, Hellertown, E. No. 1,	8.18

†Composite Sample.

*Constituents falls below guaranty.

LIZERS—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs. at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive insoluble.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
9.12	8.00	2.22	11.36	11.00	4.49	.....	4.49	4.00	2.12	2.72	1.46	3.13	2.00	37.23	36.00
8.24	8.00	1.76	*10.00	11.00	2.59	.....	2.59	1.25	1.85	2.40	1.90	*2.70	2.00	30.37	31.00
7.55	6.00	1.27	8.82	7.00	2.42	.....	2.42	2.00	.37	.72	.37	1.10	.82	21.91	25.00
8.04	8.00	1.30	9.34	9.00	2.11	.....	2.11	2.00	.95	1.04	1.47	2.11	2.06	25.17	.....
8.27	8.00	1.22	9.65	9.00	2.72	.....	2.72	2.00	1.22	1.44	.82	1.76	1.65	26.22	{ 25.00 22.00 24.10 29.00
9.24	10.00	1.21	11.15	11.00	2.95	.....	2.95	2.50	1.10	1.20	1.17	1.48	1.22	26.52	29.00
6.95	7.00	9.97	16.92	8.00	2.29	.....	2.29	2.00	2.05	4.20	2.52	4.21	4.94	48.44	{ 47.00 50.00
6.72	6.00	.41	7.12	7.00	2.02	.....	2.02	2.00	.64	.77	2.19	.37	.82	18.62	{ 22.50 24.00 24.00 21.00 25.00
*7.64	8.00	1.12	8.82	9.00	2.45	.....	2.45	2.00	.60	.74	1.16	.90	.82	22.90	.....
9.90	10.00	1.62	11.52	11.00	2.42	.....	2.42	2.00	1.82	2.21	1.26	2.47	2.47	22.22	{ 28.50 27.00
10.02	10.00	1.66	11.74	11.00	2.22	.....	2.22	2.00	1.21	1.52	1.22	1.76	1.65	29.00	{ 22.00 31.25 35.00
8.49	8.00	1.24	9.72	9.00	2.62	.....	2.62	2.00	2.45	2.40	1.54	2.94	4.11	32.22	.....
10.17	10.00	.61	*10.73	11.00	2.95	.....	2.95	2.00	2.42	2.09	1.49	2.52	2.29	32.25	35.00
9.24	8.00	.62	9.86	9.00	2.21	.....	2.21	2.00	.20	.21	1.25	.56	.41	17.85	18.00
9.21	9.00	1.22	11.12	10.00	2.65	.....	2.65	2.00	.79	.89	1.25	1.14	.82	26.50	21.00
*8.60	9.00	.91	9.51	.....	2.64	.....	*2.64	2.00	.58	.71	1.21	.92	.82	22.00	{ 22.00 12.65 20.00 12.00 20.00
8.10	8.00	.85	8.95	.....	1.95	.....	1.95	2.00	.95	1.21	1.20	1.51	1.65	22.92	.....
*11.05	12.00	.55	12.20	.....	2.22	.....	2.22	2.00	2.95	2.27	2.21	2.48	2.29	27.75	{ 21.00 22.00 27.75 25.00 27.00 25.00 27.00 25.00 28.00 42.00
12.05	12.00	.24	12.29	.....	2.99	.....	2.99	2.00	1.22	1.42	1.21	1.64	1.65	29.20	.....
*7.21	10.00	1.16	8.47	.....	2.62	.....	2.62	2.00	1.29	1.46	1.21	1.67	1.65	26.50	.....
8.06	8.00	.34	8.30	.....	.85	.....	.85	1.00	.58	.76	1.10	.86	.82	17.67	.....
6.22	6.00	.44	6.70	.....	2.12	.....	2.12	2.00	5.77	5.92	1.18	*6.10	7.40	44.40	42.00
10.00	10.00	1.42	11.42	11.00	2.72	.....	2.72	2.00	1.91	2.26	1.21	2.47	2.47	22.79	{ 28.00 22.00 20.25 20.00
9.29	9.00	1.22	10.77	10.00	2.14	.....	2.14	2.00	.79	1.10	1.22	1.42	1.22	24.51	.....
8.00	8.00	1.15	9.75	9.00	2.05	.....	2.05	2.00	1.82	2.24	1.22	2.52	2.47	20.22	{ 20.00 20.00 28.00 18.00
8.22	7.00	1.22	10.06	8.00	1.24	.....	1.24	1.00	.69	.90	1.19	1.00	.82	20.26	18.00

† Characters indicating the proportion of insoluble nitrogen that is inactive: †—two-fifths or less; ‡—two-fifths to three-fifths; §—three-fifths or more.

COMPLETE FERTI

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
2483	OGE MORTIMER CO., NEW YORK—Continued.	T. F. Kuntzman, Hellertown, R. No. 1.	
2202	†E. Frank Coe's Penna. No. 1 Grain Special.	C. J. Estabrook, Rummelfeld, R. D.	8.25
2325	E. Frank Coe's Reliable Crop Grower Special.	Geo. J. New, Blairsville,	7.06
2128		Jacob Most, Elverson,	
2061	COLUMBIA GUANO CO., BALTIMORE, MD.	P. F. Schall, Cochranston,	8.43
3106	†Columbia Grain Special Fertilizer,	John M. Cook, Riverside Park, ...	5.63
2062	Columbia Soluble Guano,	P. F. Schall, Cochranston,	7.10
2314	Columbia Stronghold Guano,	Owlett & Twilliger, Galiton,	4.96
3087	Columbia Wheat, Corn and Grass Special Fertilizer.	M. P. Whitenight, Bloomsburg,	
	CONSUMER'S CHEMICAL CORPORATION, NEW YORK.		
3215	Consumer's Complete Compound,	Sawyer Bros., Liberty,	7.09
3109	Consumer's Pure Sure Corn and Vegetable (with 3% Potash).	George Nyce, Egypt Mills,	2.35
2633	†Consumer's Pure Sure Fertilizer for gen-	Morris Speicher, Somerset, R. No. 1.	8.76
2714	eral use.	Jos. W. Helwig, Catawissa, R. No. 1.	
2679	†Consumer's Pure Sure Grain Mixture ...	Snyder & Miller, Mifflinburg,	7.36
3249		T. C. Knouse, Benton, R. No. 2,	
2932	†Consumer's Special High Grade Fertilizer	Snyder & Miller, Mifflinburg,	9.63
3269		W. L. Miller, Gleason,	
3110	†Consumer's Pure Sure Potato and Vegetable 3% Potash.	Geo. Nyce, Egypt Mills,	6.60
3079		Zehner Bros., Bloomsburg,	
3270		W. L. Miller, Gleason,	
2715		Jos. W. Helwig, Catawissa,	
2840		Morris Speicher, Somerset,	
	HENRY COPE & CO., LINCOLN UNIVERSITY, PA.		
3316	Ammoniated Phosphate,	Lyburn Whitaker, Oxford,	10.10
2148	Potato & Corn Phosphate,	S. K. Chambers & Bro., West Grove,	9.97
	JOSIAH COPE & CO., BALTIMORE, MD.		
2135	†Ammoniated Phosphate,	W. H. Dreilbelbis, Shoemakersville, R. D.	7.14
2630	†General Mixture,	Ed. H. Miller, Somerset, R. No. 4.	10.08
2631	Special Ammoniated Mixture,	Ed. H. Miller, Somerset, R. No. 4.	6.94
3312		Howard Long, Oxford,	
3560		Jonas Eavenson, Christiana,	
	JAS. G. DOWNWARD CO., COATESVILLE, PA.		
2163	Pioneer Potato Manure,	Isaac Tomlinson, Huntingdon Valley,	8.39
2165	Potato, Corn & Grain Special,	Isaac Tomlinson, Huntingdon Valley,	11.06
	EASTERN CHEMICAL CO., NEW YORK.		
3365	Eastern Planter's Favorite,	Diehl, Omwake & Diehl, Chambersburg.	2.63
	ERIE REDUCTION CO., ERIE, PA.		
2547	Acidulated Fish Special Fertilizer,	W. D. Riply, Wesleyville,	4.05
2548	Erie Grain Special,	W. D. Riply, Wesleyville,	3.32
2549	General Crop Special,	W. D. Riply, Wesleyville,	4.61
	EUREKA CHEMICAL CO., BALTIMORE, MD.		
3023	†Eureka Fish and Potash,	C. C. Davis, Greensburg,	3.67
3032	Eureka High Grade Trucker,	J. P. Schuchart, New Freedom, ...	4.63
2790	†Eureka Potato and Vegetable No 1,	Daniel Mader, Linglestown, R. No. 3	4.96
2662		Willis Gill, Cochranville,	
2611		Edwin Clause, New Tripoli,	
3047		J. H. Bartselager, Stewartstown,	
3059		Jos. P. Acker, Breilingsville,	3.08

†Composite sample.

LIZERS—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.					Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs. at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive insoluble.	Total.				
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.			
8.32	8.00	1.35	9.67	9.00	3.20	.....	3.20	3.00	.63	.79	1.21	1.00	.82	23.61	{	23.00
10.31	10.00	1.10	11.41	11.00	2.54	.....	2.54	2.00	1.06	1.50	1.31	1.81	1.66	27.62		29.00
																25.00
9.07	8.00	1.77	10.84	8.50	2.35	.....	2.35	2.00	.66	.87	1.20	1.07	.82	23.02	{	21.50
7.85	8.00	2.23	10.12	8.50	1.98	.....	1.98	3.00	1.07	1.53	1.25	1.84	1.65	25.00		25.00
9.84	10.00	3.32	13.16	10.50	3.54	.....	3.54	3.00	2.27	3.10	1.23	3.33	3.28	27.00		29.00
8.67	8.00	1.78	10.45	8.50	1.15	.....	1.15	1.00	.....	.83	1.16	.99	.82	19.96	{	20.00
8.57	8.00	1.27	9.84	9.00	2.42	.....	2.42	2.00	1.04	1.29	1.32	1.61	1.65	26.97	{	23.00
9.30	8.00	.95	10.25	9.00	2.40	.67	3.07	3.00	2.03	2.47	1.29	3.76	2.47	32.15		.....
8.30	8.00	1.62	9.92	9.00	2.54	.....	2.54	2.00	1.10	1.43	1.40	1.33	1.65	28.33	{	23.00
																23.00
																22.75
8.57	8.00	.91	9.48	9.00	2.27	.....	2.27	2.00	.72	.85	1.17	1.02	.82	21.68	{	20.50
																22.00
																20.50
14.48	14.00	1.04	15.47	15.00	3.86	.....	3.86	3.00	1.51	1.72	1.16	1.88	1.65	34.39	{	34.00
8.40	8.00	.94	9.34	9.00	2.90	.58	3.38	3.00	2.96	3.36	1.27	3.63	3.29	36.14		29.25
																22.00
10.40	7.00	.74	11.14	9.00	2.26	.....	2.26	2.00	.92	1.00	1.23	1.23	1.00	25.23	{	22.00
10.24	7.00	.66	10.90	9.00	3.62	.....	3.62	3.00	1.37	1.51	1.21	1.72	1.21	29.04		25.00
8.74	8.00	1.08	9.82	9.00	2.90	.56	3.36	3.00	.66	.81	1.10	.91	.82	23.85	{	21.00
8.53	9.00	1.58	10.41	10.00	2.40	.....	2.40	3.00	1.53	1.77	1.25	2.02	1.85	29.17		22.75
9.12	8.00	1.02	10.15	9.00	2.44	.....	2.44	2.00	1.19	1.45	1.20	1.65	1.65	25.63		26.00
															{	24.00
10.48	10.00	2.06	12.56	11.00	2.26	.....	2.26	2.00	2.86	.....	.....	*3.04	3.30	33.34		35.00
*8.55	10.00	.68	*9.43	11.00	2.57	.....	2.57	2.00	1.86	2.06	1.13	2.13	1.65	27.90		29.00
7.96	8.00	.76	8.72	.....	2.76	.....	*2.76	3.00	1.13	1.46	1.27	1.73	1.65	25.51	{	26.00
10.53	10.00	1.82	12.35	.....	.53	.13	.71	.....	.52	.83	1.36	1.13	.52	21.70	{	21.00
9.43	8.00	2.70	13.13	.....	1.75	.....	1.75	1.50	1.18	1.30	1.54	2.34	2.47	29.02		27.00
*8.60	9.00	2.45	11.05	.....	2.13	.....	2.13	1.50	.58	.98	1.39	1.32	1.23	23.64		23.00
															{	22.00
*7.68	8.00	.40	*8.08	8.50	.11	.69	.80	.50	.33	.41	1.15	.56	.41	15.84		16.50
8.69	8.00	.71	9.40	8.50	1.70	.....	*1.70	2.00	1.98	2.36	1.31	2.66	2.47	23.13		25.00
8.46	8.00	.91	9.37	8.50	2.59	.....	*2.59	3.00	1.14	1.45	1.23	1.73	1.65	25.72	{	23.00
8.94	8.00	.45	9.39	8.50	1.33	.....	1.33	1.00	.95	1.23	1.30	1.53	1.65	22.59		24.00
																22.00

††† Characters indicating the proportion of insoluble nitrogen that is inactive: †=two-fifths or less; ‡=two-fifths to three-fifths; §=three-fifths or more.

*Constituents falls below guaranty.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
2769	EUREKA FERTILIZER CO. OF LANCASTER, PENNA., LANCASTER, PA. Potato and Vegetable,	H. Manning & Son, Newville,	7.79
3126	FARMER'S FERTILIZER, SEED & HAY CO., WOMELSDORF, PA. Grass & Grain Grower,	Farmers' Fertilizer Seed & Hay Co., Womelsdorf.	6.09
2106 2764	FARMERS FERTILIZER WORKS, ELIZABETHTOWN, PA. †Pride of Donegal,	C. B. Gochnauer, Littitz, Ben Garman, Elizabethtown,	6.29
3089	W. S. FARMER & CO., BALTIMORE, MD. Clyde Brand,	A. M. Bartsenlager, Stewartstown, R. D.	7.13
2579	Pelican Guano Revised,	J. H. Duttera, New Oxford,	3.17
2965 2878 3087 2945	GRIFFITH & BOYD CO., BALTIMORE, MD. †Cereal Plant Food,	R. M. Arbogast, Winfield, R. D., .. S. A. Glosser, Linden,	3.16
2175 3086 2877 2266 2545 2546 2259 2701 2559	Griffith & Boyd Co.'s Double Strength Tobacco Grower. Farmers' Imp. Phosphate,	H. W. Rehmeier, Turnpike, Willis C. Herr, Strausburg,	11.90
	Farmers Bone Mixture,	S. B. Stoner, Grantham,	7.26
	†Farmer's Potato & Tomato,	H. W. Rehmeier, Turnpike, S. A. Glosser, Linden,	8.26
	†Reliable Crop Grower,	J. N. Walter, Stoyestown,	7.98
	Trucker's Stable Manure,	R. S. Carter, Harbor Creek, R. S. Carter, Harbor Creek, F. A. Meyers, Hooversville, E. A. Slagle, Paxinos,	6.21
		Fassmore & Co., Nottingham,	3.14
2689	W. S. HASTINGS & SON, ATGLEN, PA. Octoraro Brand,	Wm. S. Hastings & Son, Atglen, ..	4.96
2753 2344 3265 2124 3321 3494 2249 2126 2461 2342 2127 2256	S. M. HESS & BRO., INC., PHILADELPHIA †Big Crop Fertilizer,	H. M. Hostetter, Campbelltown, ... Edw. F. Miller, Somersat,	9.84
	†Farmer's General Fertilizer,	H. N. Carpenter, Wellsboro, Stephen H. Mast, Elverson,	6.79
	High Grade Potato Manure,	A. L. Velt, McKean,	6.75
	†Keystone Phosphate,	W. A. Beck, Warrior's Mark, Moses Weaver, Holsopple,	3.86
	†Potato Manure,	Stephen H. Mast, Elverson, Howard Pike, Meyersdale, Moses Weaver, Holsopple,	7.91
2247 2125 2255	†Special Corn Manure,	Stephen H. Mast, Elverson, R. No. 3 Austin Hemminger, Holsopple, R. No. 1.	7.75
3306 2789 3306	P. HOFFMAN & BRO., RAUBSVILLE, PA. Grain & Corn,	P. Hoffman & Bro., Raubsville, ... Howard Brodesman, Easton,	3.26 3.11
	†Hoffman Potato & Truck,	P. Hoffman & Bro., Raubsville, ...	
2970 2373 3195 2874 2006 3193	HUBBARD'S FERTILIZER CO. OF BALTIMORE CITY, BALTIMORE, MD. †Hubbard's Columbia Special,	H. M. Owen & Co., Lewistown, ... Geo. Pantot, White Pine,	7.67
	†Hubbard's English Compound,	P. W. G. Raker, Elizabethtville, ... Geo. Pantot, White Pine, Wm. Schadle, Klingerstown, R. D., .. P. W. G. Raker, Elizabethtville, ...	7.40

†Composite sample.

FISHERS—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.					Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs. at point of rejection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive insoluble.	Total.				
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.	Found.			Guaranteed.
10.31	8.00	1.96	12.29	9.00	.05	2.34	*2.29	2.00	.73	.97	1.16	*1.08	1.05	24.07	.....
3.77	.....	6.22	9.99	4.50	.04	.33	.27	.....	.83	2.73	2.17	*2.90	4.12	29.40	28.00
7.52	7.00	1.90	9.42	.....	.00	3.94	4.03	2.00	.62	1.26	1.00	1.86	1.05	29.72	{ 24.00
3.36	8.00	1.12	9.48	9.00	2.37	.....	2.37	2.00	.76	.92	1.20	1.12	.82	22.28	22.00
8.72	8.00	.70	9.42	9.00	2.50	.....	2.50	2.00	.36	.....	.....	.56	.41	18.12	18.50
9.08	8.00	2.01	11.00	9.00	2.17	.....	2.17	2.00	.53	.72	1.26	.93	.85	22.51	{ 20.50 22.00 20.00 20.00
8.35	8.00	1.11	9.46	9.00	2.12	.....	2.12	2.00	1.62	1.35	1.35	*2.20	2.50	23.90	20.00
9.54	7.00	2.11	10.65	8.00	2.54	.....	2.54	2.00	.56	.88	1.28	1.16	.85	22.55	21.50
11.89	9.00	1.11	12.00	10.00	.12	.73	.84	.....	.51	.85	1.48	*1.32	1.65	23.58	{ 21.00 21.00 25.00 23.00 26.00 22.00 20.00 20.00
9.11	8.00	1.08	10.14	9.00	2.90	.....	2.90	2.00	.55	.81	1.46	1.27	1.25	26.86	26.00
4.83	8.00	2.06	10.91	9.00	1.25	.28	1.71	1.00	.53	.68	1.22	.90	.85	21.10	{ 22.00 20.00 20.00 20.00	
6.17	8.00	.67	6.84	6.00	4.07	.....	4.07	2.00	2.19	2.61	1.48	3.00	2.75	32.71	28.00
8.72	8.00	.51	9.23	.....	2.35	.....	2.35	2.00	1.29	1.40	1.25	1.05	1.05	26.88	24.00
10.48	10.00	1.17	11.65	12.00	2.35	.....	2.35	2.00	1.25	1.51	1.30	1.71	1.05	27.98	{ 25.00 25.00 22.00 24.00 25.00 25.00 19.00 19.00 22.50 20.00
8.02	8.00	1.11	9.13	9.00	2.35	.....	2.35	2.00	.62	.79	1.14	.93	.82	23.44	22.00
10.18	10.00	1.79	11.97	11.00	2.27	.....	2.27	2.00	2.63	3.05	1.22	3.26	3.20	36.21	24.00
8.44	8.00	1.40	9.84	9.00	1.60	.....	1.60	1.00	.84	.99	1.16	1.15	.82	21.39	19.00
9.53	9.00	1.23	11.06	10.00	3.15	.....	3.15	2.00	1.62	2.04	1.29	2.33	2.47	30.97	22.50
9.40	8.00	1.17	9.58	9.00	.05	2.45	2.50	2.00	.88	.82	1.12	.94	.82	22.54	{ 27.50 20.75 21.00 20.00	
8.26	8.00	4.23	12.89	10.00	2.01	.....	2.01	2.00	.38	.59	1.20	.73	.82	21.64	22.00
7.51	8.00	6.12	13.64	10.00	3.19	.....	3.19	2.00	.47	.85	1.22	1.07	.82	25.42	{ 22.00 25.00
8.41	8.00	1.41	9.82	8.75	1.33	.....	1.33	1.00	.20	.34	1.20	.54	.41	15.50	.....
9.17	8.00	1.60	10.86	8.75	1.21	.....	1.21	1.00	.46	.63	1.17	.80	.82	19.54	{ 18.00 15.00 19.00

† Characters indicating the proportion of insoluble nitrogen that is inactive: †=two-fifths or less; ‡=two-fifths to three-fifths; §=three-fifths or more.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Mixture in 100 pounds.
2335 2376 2392 2377	{Hubbard's Farmer's I. X. L., Hubbard's Yellow Wrapper,	{E. J. Hall, Tioga, Geo. Pantot, White Pine, B. F. Harting, Newport, Union Hdw. Co., Mifflinburg,	{7.42 7.41
3068	M. P. HUBBARD & CO., BALTIMORE, MD. Hubbard's Animal & Fish Ammoniated Compound.	D. C. Shuman, Bloomsburg,	6.01
2519 2211 2067 2517 2085 2597 2209 2115 2195 2117	{Hubbard's Celebrated Phosphate, {Hubbard's Fish, Meat & Potash Com- pound. Hubbard's Good & Cheap Compound, {Hubbard's Harvest King for Wheat and Grass. Hubbard's Old Economy: Best for the price,	{Grant Lewis, Mansfield, H. W. Burg, East Prospect, Wm. Majer, Lema, Grant Lewis, Mansfield, D. C. Shuman, Bloomsburg, N. Guy Snyder, Alpers, H. W. Burg, East Prospect, L. A. Gelger, Joanna, P. W. G. Baker, Elizabethtown, L. A. Gelger, Joanna,	{7.11 9.00 5.21 6.30 6.25
	INTERNATIONAL AGRICULTURAL COOP- ERATION, BUFFALO FERTILIZER WORKS, BUFFALO, N. Y.		
2539 2810 2810 2273 2312 2315 2271 2352 2071 2316	{Buffalo Ideal Wheat and Corn, Buffalo Two-Eight-Three, {Buffalo One-Eight-Two, Buffalo One-Eight-Three, {Buffalo Vegetable and Potato,	{Penn Distributing Co., Union City, .. W. J. Grover & Son, Newfield, Jno. Miller, Connersport, Ed. Fraser, Shanksville, Snyder Bros., Liberty, Owlett & Twilliger, Galeton, Ed. Fraser, Shanksville, A. C. Dougherty, Grove City, H. B. Edwards, Titusville, Owlett & Twilliger, Galeton,	{9.05 7.52 8.17 8.30 4.52
	JARECKI CHEMICAL CO., SANDUSKY, O.		
2476 2544 2065 2478 2540 2066 2479	{Fish, Phosphate and Potash, General Grower. {Fish, Phosphate and Potash, Tobacco and Potato Food. Number One Formula, {Lake Erie Guano with Phosphate and Potash.	{S. S. Mosholder, Rockwood, E. J. Cass, Harbor Creek, Clark Bros., Oil City, S. S. Mosholder, Rockwood, E. J. Cass, Harbor Creek, Clark Bros., Oil City, S. S. Mosholder, Rockwood,	{10.04 9.05 10.00 12.50
	S. KENDERDINE & SONS, NEWTOWN, PA.		
2142 2144	Kenderdine's Potato Phosphate, Kenderdine's 4-8-5,	{T. S. Kenderdine & Sons, Newtown, .. T. S. Kenderdine & Sons, Newtown, ..	{6.11 6.30
	KEYSTONE BONE FERTILIZER CO., PHILADELPHIA, PA.		
2182 2448 2796 2795 2463	{1915 Keystone General Manure, 1915 Supreme Potato and Truck Manure, .. 1915 Keystone Standard Potato Manure, .. {1915 Keystone Royal Corn and Potato Manure.	{Wm. M. Holbert, Warrington, R. O. Sindell, Weatherly, B. L. Crowell, Ulysses, B. L. Crowell, Ulysses, Chas. Schoffstall, Valley View,	{8.94 11.56 8.24 8.74
	KEYSTONE GRANGE EXCHANGE, MANS- FIELD, PA.		
2016 2268 2017	{Granger's Special Crop Grower, Granger's Special Vegetable Grower,	{H. J. Hepler, Secy., Grange 1235, Pitman, R. D. L. A. Pidcoe, Linden, R. No. 2, .. H. J. Hepler, Secy., Grange 1235, Pitman, R. D.	{12.24 7.53
	KOLLER FERTILIZER CO., SWITZLAND, PA. WILLIAM LANCASTER, PHILA, PA.		
2264 2485	Markie's Ammoniated Phosphate, Lancaster County Sulphate Mixture,	{Sam. K. Hartman, York, R. D. No. 9 Henry Fogle, Bethlehem, R. No. 1, ..	{8.60 8.21

†Composite sample.

LIZERS—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs. at point of selection.
Available.		Insoluble.	Total.		Present as Murate.	Present as Sulphate.	Total.		Water Soluble.	Available.	Inactive Insoluble.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
9.58	9.00	1.57	11.15	8.75	2.21	.....	2.21	2.00	.96	1.32	\$.23	1.61	1.64	25.77	25.00
7.90	8.00	.80	8.70	8.75	2.44	.....	2.44	2.00	2.01	2.32	\$.20	2.52	2.46	20.94	21.50
8.29	8.00	1.65	9.94	9.50	2.28	.....	2.28	2.00	.70	1.38	\$.44	1.23	1.06	27.94	25.00
8.61	8.00	1.42	10.08	9.50	2.53	.....	2.53	2.00	.73	1.28	\$.53	1.81	1.68	24.28	25.00
10.41	10.00	1.88	12.29	11.50	2.43	.....	2.43	2.00	.55	.97	\$.42	1.39	1.24	22.10	25.00
7.82	8.00	2.03	9.85	9.50	1.51	.....	1.51	1.00	.59	.75	\$.23	.93	.83	20.92	15.50
9.70	9.00	1.23	10.38	10.50	2.40	.....	2.40	2.00	.55	.75	\$.27	1.02	.83	25.26	21.00
9.84	8.00	.61	10.45	9.50	2.62	.....	2.62	2.00	.44	.59	\$.25	.84	.42	22.74	25.00
9.57	9.00	1.75	11.32	10.00	2.40	.....	2.40	2.00	.76	1.32	\$.30	1.71	1.60	26.48	25.00
9.80	8.00	1.29	11.08	9.00	2.50	1.00	2.00	2.00	.55	1.33	\$.23	1.66	1.60	27.96	25.00
7.90	8.00	2.11	10.01	9.00	2.97	.....	2.97	2.00	.38	.65	\$.30	.95	.80	23.28	21.75
8.20	8.00	1.64	10.08	9.00	2.06	.....	2.06	2.00	.38	.67	\$.27	.94	.30	23.21	25.00
10.89	8.00	.70	11.59	9.00	2.24	.....	2.24	2.00	.92	1.88	\$.40	*2.28	2.50	21.68	25.00
7.06	8.00	1.24	8.90	9.00	2.25	.....	2.25	2.00	.93	1.32	\$.35	1.67	1.05	26.05	25.00
8.25	8.00	.69	8.94	9.00	2.58	.....	2.58	2.00	.52	.70	\$.20	.90	.33	22.61	27.00
8.34	9.00	.85	*9.69	10.00	1.14	.....	1.14	1.00	.47	.73	\$.18	.91	.83	19.23	21.00
9.71	9.00	.74	10.45	10.00	2.60	.....	2.60	2.00	.78	1.05	\$.22	1.27	1.25	24.20	27.00
11.69	8.00	.79	12.39	10.00	5.15	.....	5.15	5.00	.98	1.51	\$.40	1.91	1.65	24.49	20.00
10.28	8.00	.63	10.96	10.00	5.14	.....	5.14	5.00	2.16	2.97	\$.41	3.38	3.20	40.00	23.00
8.24	8.00	1.13	*9.37	10.00	1.92	.....	1.92	1.00	.99	1.29	\$.23	1.71	1.23	24.00	24.00
*7.62	8.00	1.17	*8.79	10.00	2.00	.....	2.00	2.00	1.91	2.52	\$.40	*2.92	3.28	31.20	23.00
8.15	7.00	1.62	9.77	8.00	2.55	.....	2.55	2.00	.80	1.35	\$.53	*1.83	2.48	28.27	21.00
9.05	8.00	.69	*9.74	10.00	2.75	.....	2.75	2.00	.99	1.33	\$.51	*1.84	2.05	22.98	20.10
9.22	9.00	1.42	10.64	10.00	2.70	.....	2.70	2.00	.66	.76	\$.21	.97	.83	25.28	21.50
8.82	8.00	.99	9.51	9.00	3.19	.....	3.19	2.00	1.91	2.16	\$.20	2.36	2.47	30.04	25.00
9.39	8.00	2.58	11.97	9.00	2.05	.....	2.05	2.00	.58	1.34	\$.54	1.88	1.65	29.07	23.00
8.76	8.00	.94	9.70	9.00	2.97	5.19	7.23	7.00	1.35	1.84	\$.33	2.17	2.46	23.58	.....

† Characters indicating the proportion of insoluble nitrogen that is inactive: †=two-fifths or less; ‡=two-fifths to three-fifths; §=three-fifths or more.

*Constituents falls below guaranty.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
LANCASTER BONE FERTILIZER CO., LANCASTER, PA.			
2238	Connecticut Tobacco Wrapper Grower.	Frank Eshelman, Quarryville, R. D.	6.10
2560	National Crop Grower.	A. L. Veit, McKean.	7.25
2206	†Potato, Fruit and Vegetables.	Josiah Flinchbaugh, Windsor.	6.00
2551	†Lancaster Potato King Guano.	A. L. Veit, McKean.	9.53
2282	†Potato, Tobacco and Truck Manure.	J. N. Walter, Stoyestown.	11.02
2288		Harvey Pike, Meyersdale.	
2458		Harvey Pike, Meyersdale.	
2567		Howard Replogle, Curryville.	
THE LANCASTER CHEMICAL CO., LANCASTER, PA.			
3547	No. 3 Dissolved Animal Bone & Potash. ...	Jno. H. Weaver, East Earle, R. D. No. 2.	9.22
2385	No. 1 Tobacco and Vegetable.	H. M. Stauffer, Leola.	10.17
2386	No. 2 Dewey Brand.	H. M. Stauffer, Leola.	6.65
2766	No. 11 Keystone Brand.	C. S. Zimmerman, Bismark.	7.78
2941	No. 19 Potato Special.	Harry C. Brackbill, Strausburg.	11.77
2460	No. 14 Wheat and Grass.	E. E. Boyer, Meyersdale.	6.21
LEBANON FERTILIZER WORKS, LEBANON, PA.			
2251	†Levan's Royal Potash Compound Fertilizer.	W. W. Parker, Rohrsburg, R. No. 1.	7.28
2021		Edward Mayberry, Pine Grove.	
2481		Jno. Runkle, Sec. Grange, Lakeside.	
2749	†Levan's Special Corn Fertilizer.	M. L. Bachman, Lebanon.	6.04
2022		Horace Kintale, Pine Grove.	
3376	Levan's Special Truck Fertilizer.	W. A. Bailets, Dauphin.	5.90
2459		John Runkle, Sec. Grange, Lakeside.	
LISTER'S AGRICULTURAL CHEMICAL WORKS, NEWARK, N. J.			
2197	†Lister's Corn and Potato Fertilizer.	W. L. Metzger, Red Lion, R. No. 2.	9.20
2067		F. P. Allen & Co., Titusville.	
2468	†Lister's Revised New York Special Fertilizer.	S. J. Ringler, Elk Lick.	9.78
2467		S. J. Ringler, Elk Lick.	
2924	Lister's Oneida Special.	Geo. Bard, Leacock.	7.18
2443	†Lister's Revised Corn and Potato No. 3 Fertilizer.	G. Watts & Son, Hawley.	10.08
2502		Arndt & Redline, Curryville.	
2748		Howard Weber, Hellertown, R. D. No. 5.	8.26
3117	†Lister's Revised Potato Manure.	Sylvester Garr, Easton, R. D. No. 4.	8.28
3150	Lister's Revised Special 10% Potato Fertilizer.	W. E. Ervin, Somerton.	
2742		Howard Weber, Hellertown, R. D. No. 5.	9.61
2198	†Lister's Special Crop Producer.	W. L. Metzger, Red Lion, R. No. 2.	9.33
2068		F. P. Allen & Co., Titusville.	10.08
2500	Lister's Special Tobacco Fertilizer.	Arndt & Redline, Curryville.	3.30
2932	†Lister's Success Fertilizer.	Geo. Bard, Leacock.	
2720		Zehner Bros., Bloomsburg.	
3290	†Lister's U S. Super Phosphate.	Dekin & Ash, Susquehanna.	
2501		Arndt & Redline, Curryville.	
3280		R. Sayder, Turbetville, R. D.	
2744	†Lister's Valley Brand Fertilizer.	Howard Weber, Hellertown, R. No. 5.	8.55
2199		W. L. Metzger, Red Lion, R. No. 2.	
3329		J. R. Hanks, Springboro.	
FREDERICK LUDLAM CO., BALTIMORE, MD.			
2695	†Ludlam's Cecrops Fertilizers C. & G. Brand.	Wm. Albright, Cochranville.	8.71
2335		Ben Stoner, Hellam.	
2238	†Ludlam's Cecrops Fertilizers Harvest Queen.	Shettig Bros., Ebensburg.	7.30
2696		Sechrist & Ihrig, York, R. D.	
2218	†Ludlam's Cecrops Fertilizers Special Guano.	Wm. Albright, Cochranville.	6.13
2698		Ben Stoner, Hellam.	
2219	†Ludlam's Cecrops Fertilizers Revised Spring Special.	Sechrist & Ihrig, York, R. D.	8.27
3125		Ben Stoner, Hellam.	
		Wm. Albright, Cochranville.	

†Composite sample.

FERTILIZERS—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.					Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs., at point of selection.
Available.			Total.		Present as Murate.	Present as Sulphate.	Total.		Water Soluble.	Available.	Inactive Insoluble.	Total.				
Found.	Guaranteed.	Insoluble.	Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.			
6.65	5.54	.32	6.44	6.50	2.40	2.21	*4.61	5.50	1.66	2.00	1.57	2.57	2.47	21.53	35.00	
8.06	8.00	.82	8.88	9.00	1.25	.....	1.25	1.00	.17	.85	1.11	.47	.41	16.65	21.00
7.93	7.00	.51	8.44	8.00	3.04	.....	3.04	3.00	.45	.78	1.23	1.00	.82	23.53	21.00
10.30	10.00	.76	11.06	11.00	5.83	.....	5.83	5.00	1.42	1.68	1.30	1.98	1.65	35.10	34.00
10.11	10.00	2.00	12.11	11.00	3.08	.....	3.08	3.00	1.10	1.45	1.38	1.83	1.65	29.23	24.00
9.18	10.00	.75	*9.93	11.00	.04	3.97	3.91	3.00	1.19	1.37	1.14	1.51	1.65	23.77	34.00	
8.85	7.50	.32	9.12	8.50	.05	4.20	4.25	3.00	1.15	2.02	1.66	*2.63	2.33	34.53	32.00	
9.04	8.00	1.45	10.49	9.00	.08	3.85	4.04	3.00	.46	1.00	1.31	1.31	1.03	23.39	24.00	
7.52	7.00	.41	7.93	8.00	.04	1.49	1.53	1.00	1.08	.....	1.17	.83	.83	20.16	20.00
9.33	9.00	1.02	10.40	10.00	3.11	.....	3.11	3.00	.70	1.31	2.50	1.81	1.85	27.87	26.00
9.25	8.00	2.45	11.71	9.00	1.79	.....	*1.79	2.00	.55	.90	1.24	1.14	.83	19.15	20.00
9.72	8.00	.36	10.08	9.00	2.22	.....	2.22	3.00	1.32	1.51	1.28	1.79	1.65	23.11	22.50
*7.41	8.00	1.53	8.94	9.00	2.06	.....	2.06	2.00	.80	.92	1.22	1.15	.83	21.94	22.00
6.98	7.00	1.72	8.70	8.00	4.26	.....	*4.26	6.00	1.62	1.88	1.21	2.00	1.65	29.77	21.00
7.98	8.00	1.31	9.29	9.00	3.67	.....	3.67	3.00	1.12	1.37	1.32	1.69	1.65	27.38	24.00
*8.27	9.00	1.40	*9.67	10.00	3.06	.....	3.06	3.00	.67	.85	1.20	1.05	.83	23.53	25.00
*6.67	7.00	3.29	8.87	8.00	1.14	.....	1.14	1.00	.51	.72	1.20	.82	.83	17.90	23.00
10.14	10.00	1.91	12.05	11.00	3.50	.....	3.50	3.00	1.13	1.51	1.35	1.96	1.65	30.00	25.00
10.20	10.00	1.85	12.05	11.00	3.31	.....	3.31	3.00	2.31	2.87	1.37	3.24	3.29	36.09	.....
10.08	10.00	1.40	11.48	11.00	2.68	.....	2.68	3.00	.82	1.42	.69	1.91	1.65	23.34	35.00
7.21	7.00	1.33	8.54	8.00	1.49	.....	1.49	1.00	.64	.80	1.21	1.01	.83	19.15	18.50
8.26	8.00	1.39	9.65	9.00	3.59	.....	3.59	3.00	1.05	1.82	1.49	2.31	2.06	30.33	30.00
9.84	9.00	1.71	11.55	10.00	2.12	.....	2.12	2.00	.75	1.15	1.40	1.55	1.23	25.44	27.00
8.01	8.00	1.72	9.73	9.00	2.19	.....	2.19	2.00	.87	1.08	1.25	1.33	1.08	23.08	24.00
7.99	8.00	1.35	9.34	9.00	2.97	.....	2.97	3.00	.66	.86	1.22	1.06	.83	23.53	25.00
9.90	8.00	.80	10.70	9.00	1.90	.....	1.90	2.00	.48	.....	.65	.41	17.97	21.50	
*7.78	8.00	1.55	9.08	9.00	2.10	.....	2.10	2.00	.67	.79	1.15	.94	.82	20.64	22.00
5.53	8.00	1.08	9.55	9.00	3.33	.....	3.33	3.00	1.37	1.58	1.19	1.77	1.65	27.23	23.00
9.08	9.00	1.12	10.20	10.00	3.49	.....	3.49	3.00	.57	.71	1.15	.88	.83	24.14	22.50

† Characters indicating the proportion of insoluble nitrogen that is inactive: †=two-fifths or less; ‡=two-fifths to three-fifths; §=three-fifths or more.

*Constituents falls below guaranty.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
THE MAPES FORMULA & PERUVIAN GUANO CO., NEW YORK.			
3542	The Mapes Average Soil Complete Manure,	W. H. Muth & Co., Lititz,	8.41
3470	The Mapes Complete Manure 10% Potash,	A. F. Kimmel, Orwigsburg,	7.77
2956	The Mapes Corn Manure,	W. H. Muth & Co., Lititz,	8.91
2048	The Mapes Economical Potato Manure,	P. H. Updegrave, Valley View,	8.23
2955	†The Mapes General Crop Brand,	W. H. Muth & Co., Lititz,	5.53
3101	†The Mapes Potato Manure,	Andrew Wolf, Stroudsburg,	9.97
2046		P. H. Updegrave, Valley View,	
2171	The Mapes Tobacco Manure Wrapper Brand	Hilles & Taggart, Norristown,	7.90
3574		Joe. K. Shultz, Washington Boro., R. No. 1,	
3541	The Mapes Tobacco Starter Improved,	W. H. Muth & Co., Lititz,	8.52
2172	The Mapes Top Dresser Improved Full Strength.	Hilles & Taggart, Norristown,	4.84
MARTIN FERTILIZER CO., PHILADELPHIA, PA.			
2509	Martin's Bull Head Fertiliser,	Farmer's & Consumers Commercial Union, Troy,	6.40
2129	Martin's Claremont Vegetable Grower,	C. K. Shenk, Lancaster,	6.14
2450		W. S. Kerstetter, Secy., Sunbury, R. No. 2,	
2318	†Martin's 1-3-3,	David Reigel, Jonestown, R. No. 1,	7.20
2359	†Martin's Special Compound,	J. A. Brinker, Greensburg, R. No. 3,	7.90
2344		Edwin Hauck, Bangor,	
2317	†Martin's Sure Grower,	David Reigel, Jonestown, R. No. 2,	10.47
2453		W. S. Kerstetter, Secy., Sunbury, R. No. 2,	
2346	†Martin's 2-3-3,	Edwin Houck, Bangor,	7.25
2590		Biglerville Warehouse Co., Biglerville,	
2605	†Martin's 2-3-3,	Amendes Watring, Schencksville, ..	7.25
3046		J. C. Leib & Co., Stewartstown, ...	
THE MILLER FERTILIZER CO., BALTIMORE, MD.			
2763	Club Brand,	John S. Shiffer, Derry Church, R. No. 1,	4.20
2900	†Farmers' Profit,	Biglerville Warehouse Co., Biglerville,	8.45
2433		Walter & Frederick, Montandon, ...	
2367	No. 1 Club Brand,	Geo. L. Schell, Vicksburg,	5.06
2454		Reed & Erdman, Paxinos,	
2594	No. 1 Harvest Queen,	Biglerville Hdw. Co., Biglerville, ...	5.23
2375		J. L. Gemmill, Woodbine,	
2455	†Pimlico,	Reed & Erdman, Paxinos,	3.71
2940		E. R. Witmer, Lampeter,	
3430	Potato and Vegetable Grower,	Geo. W. Bennett, Williamsport, R. No. 2,	4.06
2590	Special Tobacco Grower,	B. F. Pyle, Bridgeton, R. No. 1, ...	8.62
3085	†W. G. Phosphate,	J. P. Schuchart, New Freedom, ...	17.25
3312		M. T. Harkins, Hickory Hill,	
NASSAU FERTILIZER CO., NEW YORK.			
3053	Special General Favorite,	C. M. Grammes, Trexlertown,	8.73
3066	Nassau Special,	Lewis Husted, Dallas,	7.91
NITRATE AGENCIES CO., NEW YORK.			
2102	Peruvian Guano,	Sam'l R. Wenger, Bareville, R. No. 1,	17.25
G. OBER & SONS CO., BALTIMORE, MD.			
2298	†Ober's Harvest King Compound,	J. Wagner Geise, Bellefonte,	9.77
2286		Walter Hay, Berlin,	
2589	Special Compound for Tobacco,	D. Blocher & Co., Gettysburg,	7.35
2397		J. Wagner Geise, Bellefonte,	

†Composite sample.

LIZERS—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.					Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs., at point of selection.
Available.		Insoluble.	Total.		Present as Muriate.	Present as Sulphate.	Total.		Water Soluble.	Available.	Inactive Insoluble.	Total.				
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.	Found.			Guaranteed.
7.29	7.00	1.63	8.92	.....	.....	5.14	5.23	5.00	3.66	4.05	\$.43	4.43	4.12	44.32	40.00
4.39	3.00	1.23	5.67	5.00	10.99	.....	10.99	10.00	2.39	2.54	\$.24	2.78	2.06	44.17	.....
*6.29	3.00	4.33	10.62	10.00	.....	6.38	6.46	6.00	2.12	2.55	\$.46	3.01	2.47	40.51	35.00
4.00	4.00	2.50	6.50	6.00	1.72	6.53	8.31	8.00	2.64	2.95	\$.33	3.28	3.29	42.75	35.00	
3.11	8.00	3.97	11.08	10.00	3.21	.....	2.21	2.00	1.44	1.08	\$.37	2.05	1.05	36.38	25.00
8.13	8.00	3.43	10.55	9.00	.13	6.04	6.16	6.00	3.32	3.33	\$.34	4.17	3.71	45.81	35.00	
4.45	.....	2.63	7.08	4.50	3.20	7.79	10.00	10.50	3.60	5.33	\$.98	6.31	6.13	62.72	49.00
6.10	6.00	2.96	9.06	8.00	.04	3.29	2.33	1.00	2.78	3.51	\$.84	4.45	4.13	36.96	35.00	
6.30	5.00	1.92	8.22	8.00	1.73	1.85	*3.61	4.00	9.11	9.37	\$.23	9.30	9.53	63.43	59.00	
9.49	8.00	3.28	11.77	.....	3.96	.....	3.96	3.00	1.77	2.24	\$.39	2.63	2.47	32.14	25.00
8.46	7.00	3.06	10.54	.....	4.37	.....	4.37	5.00	1.01	1.67	\$.41	*2.08	2.47	32.49	20.00
8.43	8.00	1.82	10.25	.....	3.68	.....	3.08	3.00	.54	.30	\$.24	1.04	.32	23.39	18.75
8.13	8.00	3.40	10.53	.....	5.23	.....	5.23	5.00	1.05	1.45	\$.36	1.82	1.65	31.86	25.00
9.29	8.00	1.11	10.34	.....	2.31	.....	3.31	1.00	.52	.69	\$.34	1.03	.82	21.53	18.00
8.30	8.00	.30	9.10	.....	3.14	.....	3.14	3.00	1.44	1.65	\$.23	1.83	1.65	37.36	23.00
9.56	8.00	.55	10.11	8.50	.84	.....	.84	.50	.38	.57	\$.12	.69	.41	18.19	16.50
9.17	9.00	.51	9.68	9.50	3.25	.....	3.25	3.00	.63	.70	\$.17	.36	.52	23.39	23.00
8.01	8.00	.65	8.67	8.50	2.47	.....	2.47	2.00	.19	.32	\$.24	.56	.42	19.42	20.00
9.21	9.00	.44	9.65	9.50	2.99	.....	2.99	2.75	.77	.92	\$.21	1.13	1.06	34.26	34.50
8.00	8.00	1.08	9.17	8.50	3.43	.....	3.43	3.00	1.04	1.32	\$.30	1.63	1.65	26.64	23.25
8.90	9.00	1.12	10.02	9.50	1.49	.....	1.49	1.50	1.10	1.40	\$.29	1.69	1.65	23.76	25.00
3.73	8.00	.50	9.23	8.50	1.65	.....	1.65	1.00	1.08	1.34	\$.22	1.63	1.65	23.46	23.00
7.04	7.00	.45	7.53	7.50	.39	.....	.39	.50	.25	.36	\$.16	.52	.41	15.66	15.00
3.33	8.00	.96	9.34	9.00	3.13	.....	3.13	3.00	.70	.85	\$.12	.97	.32	23.64	23.50
9.23	9.00	1.19	10.57	10.00	3.46	.....	3.46	3.00	1.87	2.32	\$.34	2.66	2.47	32.54	.....
10.38	10.00	1.73	12.71	11.00	2.63	.....	2.63	2.00	2.47	9.96	\$.37	10.33	10.69	70.10	77.00
10.47	9.00	1.29	11.76	10.00	3.29	.....	3.29	3.00	1.22	1.53	\$.36	1.94	1.65	30.06	27.00
8.47	3.00	1.14	9.61	9.00	3.73	.44	4.17	3.00	1.66	2.05	\$.43	2.43	2.47	32.53	24.00	

§ § Characters indicating the proportion of insoluble nitrogen that is inactive: §—two-fifths or less; §—two-fifths to three-fifths; §—three-fifths or more.

*Constituents falls below guaranty.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
3319	OXFORD PACKING WORKS, OXFORD, PA.		
3320	O. P. W. No. I,	J. C. Fisher, Cochranville, R. No. 1,	8.85
	O. P. W. No. II,	J. C. Fisher, Cochranville, R. No. 1,	10.54
2359	PATAPSCO GUANO CO., BALTIMORE, MD.		
3243	{†Special Columbian Guano for Truck, Po- tatoes and Tobacco.}	Harry Rader, Easton, R. No. 2,	8.58
2260		E. H. Snyder, Dalton,	
2266	{†Coon Brand Guano,	P. J. Blough's Bros., Hooversville,	8.58
2341		J. W. Flinchbaugh, Windsor,	
3250	Patapasco Corn and Tomato Fertilizer, ...	G. H. Dildine, Orangeville,	10.89
3331		Chas. Shimmel, Ackermansville,	
2328	{†Grange Mixture,	Jos. Burkholder, Hummelstown, ...	9.37
3236		Jas. Slager, Westfield,	
3407	{†Patapasco Money Maker,	Dan Ringrose, Cadis,	7.71
3409		J. B. Lightner, Laysville,	
2527	Patapasco O. K. Phosphate,	C. S. Bruner, New Bloomfield,	8.31
3410	Patapasco Special Potato Manure,	Jas. Slager, Westfield,	10.96
2261	Sea Gull Guano,	C. S. Bruner, New Bloomfield,	10.55
2215	{†Patapasco Special Early Truck,	P. J. Blough's Bros., Hooversville,	5.92
2439		H. C. Koehler, Wrightsville,	
3426	Patapasco Special Prolific Potato Phosphate.	Walter & Frederick, Montandon,	7.18
		Summitt Lumber Co., Clarks Sum- mit,	
2216	{†Patapasco Special Tobacco and Potato	H. C. Koehler, Wrightsville,	8.47
3332	Fertilizer.}	Jas. Burkholder, Hummelstown, ...	
2349	PETROSKEYS SONS, LATROBE, PA.		
	Petroskeys Complete Fertilizer,	O. H. Saxman, Latrobe,	8.98
	PIEDMONT MT. AIRY GUANO CO., BALTI- MORE, MD.		
2432	{†Levering's Ammoniated Bone,	A. F. Stutzman & Co., Johnstown,	14.06
3211		T. S. Brown, Morris,	
2224	Piedmont Economy,	H. H. Loose, Menges Mills,	7.88
2604	Plow Brand,	Amendes Wotring, Schencksville, ...	8.51
2603	Royal Ammoniated Bone and Potash,	Amendes Wotring, Schencksville, ..	6.51
	PITTSBURGH PROVISION AND PACKING CO., PITTSBURGH, PA.		
3080	Corn and Potato Fertilizer,	W. J. Gibson, Hydetown,	6.00
3336	Lawn Fertilizer,	R. G. Allison, Ambridge,	8.95
3007	Special Potato Fertilizer,	Weddele & Sutton, West Newton, ..	8.52
	POLLOCK FERTILIZER CO., BALTIMORE, MD.		
2217	Ammoniated Super Phosphate,	J. W. Gable, Hellam,	9.95
2225	Owl Brand Guano Revised,	J. H. Heely, Littlestown,	8.60
2226	Special Potato and Tobacco Fertilizer Re- vised.	Harvey Spencer, Cochranville,	8.43
2558	{†Pollock Fertilizer Co's Special Wheat and	Frank Oster, Osterburg,	
2204	Corn Fertilizer.}	S. A. Barsinger, Red Lion, No. 2,	8.11
2566		J. L. Longenecker, Woodbury,	
	PUGH & LYONS, OXFORD, PA.		
2654	Bone Phosphate,	C. R. Kirk & Co., Oxford,	4.91
2655	B. E. P. Phosphate,	C. R. Kirk & Co., Oxford,	5.81
2652	Potato Phosphate,	C. R. Kirk & Co., Oxford,	7.06
	RAMSBURG FERTILIZER CO., FREDERICK, MD.		
3360	Old Virginia Compound,	Frank Miller & Son, Greencastle, R. No. 2.	5.93
	RASIN MONUMENTAL CO., BALTIMORE, MD.		
2110	{†Rasin's Capital Crop Compound,	Geo. E. Buck, Krumsville,	8.31
2628		Jacob Miller, Somerset, R. No. 5. ...	
2118	Rasin's Champion Potato and Vegetable Manure.	L. A. Geiger, Joanna,	7.25

†Composite sample.

LIZERS—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs. at point of selection.
Available.			Total.		Present as murate.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive insoluble.	Total.			
Found.	Guaranteed.	Insoluble.	Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
9.29 10.75	7.50 8.50	1.88 2.15	10.77 12.90	8.00 9.00	3.53 3.00	..... .....	3.53 3.00	3.00 3.00	.91 .49	1.87 .85	1.60 \$.51	2.47 1.46	2.47 1.44	31.95 27.94	27.00 35.00
*7.73	8.00	1.09	8.82	9.00	3.34	.....	3.34	3.00	1.40	2.04	\$.48	2.52	2.47	30.12	..... 29.00 25.00
9.11	9.00	.60	*9.71	10.00	3.63	.....	3.63	3.00	.58	.73	\$.18	.91	.82	24.44	..... 21.00 25.00
9.45	9.00	1.16	10.61	10.00	2.15	.....	2.15	2.00	1.03	1.21	\$.20	1.41	1.23	24.24	21.00 25.00
8.09	8.00	1.66	9.75	9.00	2.23	.....	2.23	2.00	.94	1.36	\$.38	1.74	1.65	25.06	26.00 25.00
8.58	8.00	1.19	9.77	9.00	2.59	.....	2.59	2.00	.69	.80	\$.18	.98	.82	22.53	21.50 22.00
8.79	8.00	1.43	10.22	9.00	2.26	.....	2.26	2.00	.56	.78	\$.22	.98	.82	22.15	22.00
*9.49	10.00	1.56	11.05	11.00	2.33	.....	2.33	3.00	1.40	1.64	\$.18	1.82	1.65	27.73	27.00
8.10	8.00	1.21	9.31	9.00	1.24	.....	1.24	1.00	.68	.82	\$.14	.96	.82	19.16	21.00
8.63	8.00	1.23	9.86	9.00	3.60	.....	3.60	3.00	2.92	3.55	\$.50	4.05	4.11	38.53	23.00 34.00
10.96	10.00	.51	11.47	11.00	3.03	.....	3.03	3.00	2.64	3.28	\$.32	3.58	3.29	37.14	31.25 31.25
8.00	8.00	1.49	9.49	9.00	3.27	.....	3.27	3.00	1.34	1.58	\$.21	1.79	1.65	27.16	25.00 26.00
9.71	8.58	6.15	15.86	14.11	3.23	.....	*3.23	3.63	1.70	3.29	\$.37	4.16	3.39	41.54	30.00
8.96	9.00	.57	9.43	.....	3.22	.....	3.22	3.00	.41	.61	\$.30	.91	.82	23.29	24.00 22.00
10.22	10.00	.82	10.84	.....	2.15	.....	2.15	2.00	.21	.33	\$.13	.46	.21	17.68	16.50
9.17	8.00	.28	9.45	.....	2.52	.....	2.52	2.00	.44	.96	\$.71	1.67	1.65	25.40	22.00
6.49	6.00	.38	6.87	.....	3.94	.....	3.94	3.00	.37	.59	\$.46	1.03	1.00	28.23	21.00
*8.06	9.00	1.35	*9.41	11.00	3.23	.....	3.23	3.00	.20	.77	\$.56	1.23	1.43	34.38	27.00
7.49	4.00	6.31	*13.80	16.00	2.63	.....	2.63	1.50	.40	2.02	\$.72	2.74	2.87	32.33	40.00
10.64	9.00	.92	11.56	10.00	.11	7.50	7.61	7.00	.46	1.31	.45	1.76	1.64	39.70	30.00
8.57	8.00	.89	9.46	9.00	2.21	.....	2.21	2.00	1.32	1.54	\$.21	1.75	1.65	24.90	.....
8.98	8.00	.88	9.31	9.00	2.15	.....	2.15	2.00	.40	.....	.....	.61	.41	19.75	18.00
8.09	8.00	1.57	9.66	9.00	3.40	.....	3.40	3.00	1.42	1.64	\$.17	1.81	1.65	27.53	24.00
8.18	8.00	1.25	9.43	9.00	2.39	.....	2.39	2.00	.62	.75	\$.18	.93	.82	21.61	16.00 20.00 20.00
10.11	6.00	5.64	15.75	11.00	2.17	.....	2.17	2.00	.44	1.50	\$.31	1.81	1.65	23.81	27.50
9.92	7.00	5.33	15.25	.....	3.32	.....	3.32	2.00	.49	1.23	\$.41	1.69	.82	30.37	25.50
11.77	7.00	2.18	12.95	.....	3.31	.....	*3.31	6.00	.22	.66	\$.31	.97	.82	23.11	23.50
9.73	8.00	2.23	12.05	10.00	3.52	.....	3.52	3.00	.56	.75	\$.26	1.01	.81	25.96	22.00
9.67	9.00	1.26	10.33	10.00	3.35	.....	3.35	3.00	.82	.93	\$.17	1.10	.82	26.52	21.00
9.46	3.00	1.07	10.53	9.00	2.34	.....	2.34	3.00	2.23	2.63	\$.28	*2.91	3.29	31.43	22.50 30.00

§ § § Characters indicating the proportion of insoluble nitrogen that is inactive: §—two-fifths or less; §—two-fifths to three-fifths; §—three-fifths or more.

*Constituents fall below guaranty.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
RASIN MONUMENTAL CO., BALTIMORE, MD.—Continued.			
2876	{†Rasin's Empire Guano Special,	J. L. Gemmill, Woodbine,	12.79
3085		H. B. Low & Son, Orangeville,	
2827	Rasin's Great Ammoniated Crop Compound,	Jacob Miller, Somerset, R. No. 5, ..	8.64
2899	Rasin's Nitro Top Dresser,	E. A. Slagle, Paxinos,	4.89
2912	{†Rasin's Quality Compound,	Siegfried & Schwoyer, Kempton, ...	9.07
2968		W. W. Book, Port Royal,	
2867		E. S. Shire, Glatfelters,	
2041	{†Rasin's Wheat, Corn and Oats Mixture,	S. A. Haas, Valley View,	7.61
2966		W. W. Book, Port Royal,	
2815	{†Rasin's Wm. Penn Crop Grower,	Edward Leibold, Saegersville,	8.55
2878		C. S. Walker & Co., Chadd's Ford Junction,	
READING BONE FERTILIZER CO., READING, PA.			
2123	Reading All Crop Special,	Isaac M. Stoltzfus, Elverson, R. No. 3,	7.94
2822	{†Blood, Meat and Potash Mixture,	C. R. Bucher, Myerstown, R. No. 4, ..	6.79
3009		J. P. Sloterback, Fayette City,	
2990		J. H. Reitz, Millway,	
2909	{†Farmers' Choice,	W. J. Schmick & Son, Garmansville, ..	5.63
3241		S. L. Smith, Mill Creek,	
2132		Isaac M. Stoltzfus, Elverson, R. No. 3,	9.38
2009	{†Farmers' Tankage and Potash for Corn, Grain and Grass,	Chas. Maurer, Hepler,	
2649		Warren W. Moses, Exton,	
2923	Gilt Edge Potato and Tobacco Grower,	J. H. Reitz, Millway,	
2908		W. J. Schmick, Garmansville,	
2334	{†Golden Harvest,	C. R. Bucher, Myerstown, R. No. 4, ..	9.22
2929		J. H. Reitz, Millway,	
2112	Reading Prize Winner,	C. R. Bucher, Myerstown, R. No. 4, ..	7.24
2011	{†Schuylkill Valley Favorite for Grain and Grass,	Schlegel, Adam & Co., Fleetwood, ...	5.97
2651		Chas. Maurer, Hepler,	
2650		Warren W. Moses, Exton,	
2113	{†Reading Special Potato and Tobacco Ma- nure,	Warren W. Moses, Exton,	8.96
3010		Schlegel, Adam & Co., Fleetwood, ...	
3167	Tobacco and Truck Special,	J. P. Sloterback, Fayette City,	5.35
2804	Truck, Fruit, Tree, Vine, Potato and Tobacco Grower,	A. K. Kulp, Pottstown,	6.01
		Frank Littlefield, Coudersport,	
READING CHEMICAL CO., READING, PA.			
3163	Reading Big Crop Special,	John W. Root, Kimberton,	5.89
3165	Reading Grain Special,	John W. Root, Kimberton,	5.63
ROBT. A. REICHARD, ALLENTOWN, PA.			
2357	Improved Top Dresser,	Wm. Mittman, Easton, R. No. 3, ..	5.85
2178	{†Royal Phosphate,	Wm. Hall, Danboro,	6.97
2614		Chas. Toch, New Tripoli,	
REICHARD HIDE AND TALLOW CO., ASHLAND, PA.			
2915	Farmer's Jewel,	Siegfried & Schwoyer, Kempton, ...	5.72
F. S. ROYSTER GUANO CO., BALTIMORE, MD.			
2361	{†Royster's Corn and Hop Special Fertilizer,	J. N. Getz Co., Lock Haven,	9.41
3422		S. T. Ingham, Nicholson,	
2445		F. J. Otto, Herndon, R. No. 1,	
2399	{†Royster's Cuckoo Crop Grower,	J. S. Waite & Co., Bellefonte,	6.61
2470		Richard Glatfelter, Salisbury,	
2820		S. A. Phillippy, Schaeferstown, R. No. 1,	
2064	{†Royster's Dreadnought Fertilizer,	W. C. Work & Son, Cochranston, ...	
2449		D. L. Latsha, Red Cross,	
2170	{†Royster's Eldorado Compound,	L. W. Danerhower, Southampton, ...	8.56
3351		Lewis Stenigrabe, Mercer,	

†Composite sample.

LIZERS—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs. at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive insoluble.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
8.43	8.00	1.17	9.60	9.00	2.58	.....	*2.58	3.00	1.55	1.71	\$.15	*1.86	2.47	26.30	22.00
13.43	12.00	1.21	14.70	13.00	2.53	.....	2.53	2.00	.60	.71	\$.11	.86	.82	24.73	22.50
4.44	4.00	.23	*4.73	5.00	2.71	.....	2.71	2.00	5.06	.....	.....	8.13	8.23	53.45	44.00
7.69	7.00	.39	8.53	8.00	2.53	.....	2.53	2.00	.88	.99	\$.15	1.14	.82	22.82	21.00
5.18	8.00	1.44	9.62	9.00	2.06	.....	2.06	2.00	.52	.....	.....	.64	.41	19.68	17.15
9.11	8.00	1.22	10.33	9.00	1.05	.....	1.05	1.00	.71	.87	\$.14	1.01	.82	19.98	17.50
9.96	10.00	1.44	11.40	11.00	2.90	.....	2.90	2.00	1.23	1.52	\$.13	1.70	1.64	27.72	25.00
*9.97	10.00	1.25	*10.22	11.00	2.12	.....	2.12	2.00	1.21	1.53	\$.16	1.69	1.64	26.09	22.50
8.63	8.00	.75	9.38	9.00	7.77	.....	*7.77	8.00	.83	.95	\$.12	1.08	.82	22.38	20.00
10.24	10.00	.94	11.18	11.00	2.89	.....	2.89	2.00	.56	.73	\$.18	.91	.82	24.10	22.00
12.81	12.00	1.28	14.09	13.00	3.52	.....	3.52	2.00	1.33	1.41	\$.15	1.56	1.64	31.21	28.00
10.62	10.00	1.13	11.75	11.00	3.02	.....	3.02	2.00	1.21	1.39	\$.15	1.54	1.64	27.83	23.50
9.00	9.00	1.79	10.79	10.00	3.00	.....	3.00	2.00	1.73	2.19	\$.26	2.45	2.46	30.66	22.50
7.40	7.00	.70	8.10	8.00	2.50	.....	2.50	2.00	.29	.....	.....	.49	.41	18.78	16.00
11.90	12.00	1.17	13.07	13.00	3.51	.....	3.51	2.00	.65	.77	\$.13	.90	.82	26.91	24.00
6.51	6.00	1.06	7.57	7.00	2.78	.....	*2.78	2.00	1.82	2.81	\$.14	2.45	2.46	27.64	20.00
8.77	8.00	1.05	9.82	9.00	3.57	.....	3.57	2.00	2.48	2.91	\$.29	3.20	3.29	34.82	28.00
7.91	8.00	.99	8.90	.....	3.98	.....	3.98	4.00	1.26	1.41	\$.23	1.64	1.65	27.63	20.00
7.20	7.00	.54	7.74	.....	1.88	.....	1.88	2.00	.34	.....	.....	.52	.41	17.80	16.00
6.07	6.00	.65	6.72	7.50	4.19	.....	4.19	4.00	5.71	6.56	\$.39	6.95	6.53	50.47	43.00
7.09	7.00	.80	*7.89	8.50	2.03	.....	2.03	2.00	.32	.60	\$.83	.98	.82	19.98	19.00
9.97	8.00	1.74	11.71	10.00	2.32	.....	2.32	2.00	.43	1.42	\$.52	1.94	1.64	27.78	.....
7.96	8.00	2.16	10.12	8.50	3.80	.....	3.80	2.00	1.41	1.87	\$.32	2.19	2.06	29.35	28.00
8.27	8.00	1.43	9.70	8.50	1.27	.....	1.27	1.00	.63	.85	\$.11	.96	.82	19.41	18.00
8.40	8.00	1.58	9.98	8.50	2.27	.....	2.27	2.00	1.29	1.61	\$.14	1.75	1.65	25.30	24.75
10.64	10.00	1.48	12.12	10.50	3.01	.....	3.01	2.00	1.37	1.71	\$.13	1.84	1.65	29.26	25.00

† † Characters indicating the proportion of insoluble nitrogen that is inactive: †=two-fifths or less; ‡=two-fifths to three-fifths; §=three-fifths or more.

*Constituents falls below guaranty.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
F. S. ROYSTER'S GUANO CO., BALTIMORE, MD.—Continued.			
2524	Royster's Favorite Compound,	Braman & Swan, Nelson,	9.78
2481	†Royster's Fish, Flesh and Fowl,	Jno. Strickler, Mifflinburg,	5.48
3200	Hosteter's Special Fruit and Vegetable Mixture.	R. J. Dunham, Wellsboro,	5.67
2429		Abram Hostetler, Johnstown, R. No. 3,	
2332	†Royster Utopia Compound,	S. A. Phillippy, Schaefferstown, R. No. 1,	6.83
2035		Thos. Kuntzleman, Orwin,	
2481		John Kunkel, Bath,	
SCHAAL SHELTON FERTILIZER CO., BUFFALO, N. Y.			
2089	Schaal's Special Corn and Potato,	Brooklyn Milling Co., Spartanburg,	6.53
2087	Special Guano,	Brooklyn Milling Co., Spartanburg,	8.25
SCOTT FERTILIZER CO., ELKTON, MD.			
2120	†Scott's Corn and Oats Grower,	Levi Beller, Elverson, R. No. 2, ...	7.13
2126	Scott's Sure Growth Compound,	Abraham Burlinger, Kunkletown, ..	7.76
3112		S. Applegate, Bethlehem,	
2657	†Scott's Potato Grower,	Mackey & Yerkes, Oxford,	8.42
2122		Levi Beller, Elverson, R. No. 2, ...	
2715	†Scott's Sure Growth Super Phosphate, ..	Abraham Burlinger, Kunkletown, ...	7.88
2616		Mackey & Yerkes, Oxford,	
2121		Levi Beller, Elverson, R. No. 2, ...	
2745		Elias S. Brubaker, Richland,	
M. L. SHOEMAKER & CO., PHILADELPHIA, PA.			
2173	†Swift Sure Guano for Tomatoes, Truck and Corn,	Hilles & Taggart, Morristown,	8.04
2180	Shoemaker's New Jersey Special for Oats, Swift Sure Phosphate for general use,	Stephen M. Stoltzfus, Morgantown, ..	
2616		Frank Hoffman, Netfville,	
2737	Swift Sure Phosphate for Tobacco,	Richard Fogel, Heckertown,	5.73
2174		Hilles & Taggart, Morristown,	9.23
2181	Swift Sure Special 10% Potato Fertilizer No. 1,	Stephen M. Stoltzfus, Morgantown, ..	6.40
3149		W. E. Erwin, Somerton,	5.78
2904	Twenty Three Dollar Super Phosphate, ..	N. F. Poole, Ruffsdale,	7.57
F. A. SIMON, MAUD, PA.			
3289	Farmers' Favorite High Grade Potato Special Phosphate,	F. A. Simon & Bro., Cornwells,	8.85
H. H. SMYSER, YORK, PA.			
2865	Ammoniated Chicago Fertilizer,	Sam. K. Hartman, York, R. D. No. 3,	6.22
SWACKS FERTILIZER WORKS, INC., DUBOIS, PA.			
2053	Swacks Corn Special Fertilizer,	Sanford & Rumminger, Franklin, ..	8.25
2052	Swacks General Crop Grower,	Sanford & Rumminger, Franklin, ..	8.39
2054	Swacks Grain and Corn Fertilizer,	Sanford & Rumminger, Franklin, ..	9.44
2051	Swacks Grain Grower,	Sanford & Rumminger, Franklin, ..	8.44
2050	†Swacks Special Potato Fertilizer,	Sanford & Rumminger, Franklin, ..	11.45
2419		Chas. Yeackle, Patton,	
SWIFT & COMPANY, BALTIMORE, MD.			
3206	Swift's Champion Wheat and Corn Grower, ..	Peter Kline, Morris,	10.77
3337	Swift's Pure Continental Beet Special,	R. G. Young Sons, New Galilee, ...	6.38
2740	†Swift's Pure Corn and Wheat Grower,	I. V. Bachman, Hellertown,	7.25
3041	†Swift's Pure Corn, Wheat and Oat Special,	Jas. Fulton & Son Co., Stewartstown	8.56
2584		J. R. Weaver & Bro., New Oxford, ..	
1366	†Swift's Pure Diamond, A Vegetable, Tobacco and Fruit Grower,	Albert C. Myers, Lock Haven,	5.71
2931		J. H. Reitz, Millway,	
2189		Thos. Haines Co., Malvern,	
2134		Isaac M. Stoltzfus, Elverson, R. No. 3,	
2212		H. C. Kocher, Wrightsville,	

†Composite sample.

LIZERS—Continued

Phosphoric Acid in 100 Lbs.					Potash in 100 Lbs.				Nitrogen in 100 Lbs.					Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of selection.
Available.		Insoluble.	Total.		Present as murate.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive—Insoluble.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
9.95 8.06	10.00 8.00	1.21 1.85	11.16 9.91	10.50 8.50	2.26 3.11	..... .....	2.26 3.11	2.00 3.00	1.49 1.12	1.68 1.42	1.08 1.22	1.74 1.64	1.65 1.65	26.50 26.38	{ 26.00 29.00
*8.26	8.50	9.89	18.15	17.00	4.17	.....	4.17	3.00	.24	1.12	1.60	1.72	1.85	32.30	
8.51	8.00	1.96	10.47	8.50	3.33	.....	3.33	3.00	1.77	2.27	1.23	2.50	2.47	31.23	{ 26.75 23.00
*7.71 8.16	8.00 8.00	1.67 1.69	9.33 9.85	9.00 9.00	3.41 3.48	..... .....	3.41 3.48	3.00 3.00	1.15 .59	1.45 .76	1.19 1.21	1.64 .97	1.65 .83	26.62 24.02	{ 27.00 24.00
11.22	10.00	1.31	12.53	.....	1.83	.....	1.83	1.00	.21	.35	1.24	.59	.42	18.66	{ 17.50 18.00
12.25	10.00	1.36	13.61	.....	3.77	.....	3.77	3.00	2.55	3.09	1.30	3.39	3.30	39.24	{ 27.00 28.50 24.00 25.00 22.50
11.18	10.00	2.20	13.38	.....	3.36	.....	3.36	3.00	.91	1.30	1.46	1.76	1.65	30.36	
9.66	8.00	2.59	12.25	.....	3.67	.....	3.67	3.00	.77	1.48	1.34	1.77	1.65	29.77	
10.02	8.00	1.98	12.00	10.00	5.43	.....	5.43	3.00	1.24	1.71	1.27	1.98	1.65	34.60	{ 33.00 37.00 23.50 18.00 32.00 35.00 34.00
9.42 9.79 10.18 10.84	8.00 9.00 8.00 6.00	3.19 1.21 1.42 1.64	12.61 *11.00 11.60 12.48	11.00 12.00 11.00 8.00	3.03 3.46 1.07 3.99	..... ..... 3.80	3.03 3.46 4.87 3.99	2.00 3.00 4.50 3.00	.39 1.75 1.67 2.27	.99 2.54 2.89 3.41	1.52 1.44 1.40 1.54	1.51 *2.98 3.29 3.35	.82 3.29 3.29 3.20	27.46 34.52 40.11 41.13	
9.14	6.00	2.96	12.10	9.00	2.43	.....	2.43	1.25	.59	1.07	1.47	1.54	1.03	26.22	22.00
*7.52	11.00	1.74	*9.28	13.00	10.35	.....	10.35	10.00	1.70	2.83	1.47	*3.30	4.00	48.16	45.00
8.40	8.00	1.37	*9.77	10.00	2.08	.....	2.08	2.00	.40	.63	1.29	.92	.82	21.00	17.00
*9.46 11.42 7.89 7.54 8.64	10.00 10.00 7.00 7.00 8.00	.93 .85 1.39 .51 1.72	*10.39 12.27 8.78 8.06 10.36	11.00 11.00 8.00 8.00 9.00	1.91 1.19 1.30 .96 2.97	..... ..... ..... ..... .....	1.91 1.19 1.30 .96 2.97	2.00 1.00 1.00 1.00 3.00	.31 .73 .39 .23 .69	.57 .49 .82 .45 1.03	1.35 1.31 1.47 1.25 1.38	.92 .80 *1.29 1.50 *1.41	.85 .85 1.50 1.65 1.65	21.34 21.16 20.31 16.57 25.41	{ 24.00 22.00 23.00 19.00 28.00 24.50
13.05 8.30 10.29	12.00 8.00 10.00	1.87 1.06 1.66	14.92 9.36 11.95	..... ..... .....	2.04 3.14 1.82	..... ..... .....	2.04 3.14 1.82	2.00 3.00 2.00	.77 .38 .75	1.12 .60 1.10	1.29 1.30 1.37	*1.41 .90 1.47	1.65 .82 1.63	27.61 22.92 24.75	{ 29.00 22.00 23.00 24.50 23.00 23.00 23.00
*10.64	11.00	1.64	12.23	.....	2.51	.....	*2.51	3.00	.61	.70	1.20	.90	.82	24.09	23.00
7.83	8.00	1.59	9.42	.....	2.67	.14	2.81	3.00	1.66	1.96	1.33	2.34	2.47	23.66	{ 26.75 23.00

† † † Characters indicating the proportion of insoluble nitrogen that is inactive: †=two-fifths or less; ††=two-fifths to three-fifths; †††=three-fifths or more.

*Constituents falls below guaranty.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
SWIFT & CO., BALTIMORE, MD.—Continued.			
2167	{ Swift's Pure Diamond W Vegetable and Fruit Grower.	L. W. Danenbower, Southampton, ..	5.67
2607	{ Swift's Pure Diamond X Fertilizer,	L. D. Leiby, Garmansville,	
2534	{ Swift's Pure Farmer's Favorite,	W. P. Rouse & Son, North East, ...	7.79
3158	{ Swift's Pure Diamond K Grain Grower,	W. J. Pratt & Sons, Wanaset,	4.06
2806	{ Swift's Pure Market Garden Manure,	N. J. Leete, Coudersport,	9.72
3102	{ Swift's Pure Red Steer,	Harry Van Fleet, East Stroudsburg, ..	
2531	{ Swift's Pure Regal Top Dresser,	W. P. Rouse & Son, North East, ...	6.61
3158	{ Swift's Reliable Grain Fertilizer,	Wm. O. Ball, Media,	
2268	{ Swift's Pure Special Formula C,	Hill & Walker, Shanksville,	
2213	{ Swift's Pure Super Phosphate,	H. C. Kocher, Wrightsville,	5.64
2264	{ Swift's Pure Regal Top Dresser,	Albert C. Myers, Lock Haven,	
3287	{ Swift's Reliable Grain Fertilizer,	J. F. Carl, Great Bend,	6.80
2456	{ Swift's Pure Special Formula C,	Reed & Erdman, Paxinos,	
2363	{ Swift's Pure Super Phosphate,	Albert C. Myers, Lock Haven,	4.28
3162	{ Swift's Pure Special Formula C,	John W. Root, Kimberton,	
3161	{ Swift's Pure Super Phosphate,	John W. Root, Kimberton,	6.66
2094	{ Swift's Pure Super Phosphate,	Penn Distributing Co., Union City, ..	4.28
J. M. TEMPLIN, HONEYBROOK, PA.			
2673	No. 4. Atlas Brand,	J. M. Templin, Honeybrook,	6.98
I. P. THOMAS & SONS CO., PHILA., PA.			
2756	{ High Grade Potato Fertilizer,	Monroe A. Wike, Kleinfeltersville, ..	9.89
2019	{ Improved Fertilizer,	J. K. Maurer, Pitman, R. D.,	6.61
2200	{ Normal Phosphate,	J. H. Kinsely, Red Lion, R. No. 2, ..	10.12
3348	{ Scientific Tobacco Guano,	Wm. J. Moyer, Greenville,	6.23
3676	{ Special High Grade Potato Fertilizer, ..	E. D. Leaman, Ronks,	
2795	{ Special Potato Fertilizer,	N. Guy Snyder, Aspers,	9.17
2255	{ Top Dresser,	Titus Bachman, Hellertown,	
3071	{ Victor Potash Guano,	W. H. Brace, Dallas,	8.77
2201	{ Thomas Wheat and Corn Manure,	J. H. Kinsely, Red Lion, R. No. 2, ..	
2018	{ Thomas Wheat and Corn Manure,	J. K. Maurer, Pitman, R. D.,	5.04
2556	{ Thomas Wheat and Corn Manure,	Ed. Shuey, Lickdale, R. No. 1,	9.61
2316	{ Thomas Wheat and Corn Manure,	Ed. Shuey, Lickdale, R. No. 1,	
2314	{ Thomas Wheat and Corn Manure,	John Kase, Elysburg,	8.54
2703	{ Thomas Wheat and Corn Manure,	L. H. Kinsely, Red Lion, R. No. 2, ..	
2202	{ Thomas Wheat and Corn Manure,	E. S. Risser, Palmyra, R. No. 2, ..	
2760	{ Thomas Wheat and Corn Manure,		
JAMES THOMAS, WILLIAMSPORT, PA.			
3274	Thomas Special Compound for Wheat, Oats, Corn and Grass,	Thos. Green, Canton,	8.75
3275	Thomas Standard Brand Phosphate,	Thos. Green, Canton,	6.10
TRENTON RONE FERTILIZER CO., TRENTON, N. J.			
2166	Keytone Potato,	Hobensack Bros., Ivyland,	8.84
3797	Special Corn Manure,	L. A. Howells, Morrisville,	9.78
3309	Farmer's Special Potato Manure,	Wm. Hobensack, Ivyland,	9.01
3308	Tomato and Truck,	Wm. Hobensack, Ivyland,	9.77
JACOB TRINLEY & SONS, LINFIELD, PA.			
2689	Grain and Grass Grower,	A. M. F. Stiteler, Uwchland,	7.37
2688	Special Potato Manure,	A. M. F. Stiteler, Uwchland,	9.20
F. W. TUNNEIL & CO., INC., PHILADELPHIA, PA.			
3151	{ Complete Phosphate,	M. C. Michener, Media,	7.92
3130	{ Complete Super Phosphate,	Geo. R. Watson, Embreeville,	7.77
2942	{ Excelsior Phosphate,	Harry C. Breckbill, Strausburg, ...	5.94
3129	{ Jersey Potato Manure,	Geo. R. Watson, Embreeville,	
3143	{ No. 1 Potato Manure,	Henry W. Satterwaite, Woodbourne, ..	8.41
3155	{ No. 2 Potato Manure,	Edw. Brinton & Sons, West Chester, ..	10.37
3138	{ Potato and Vegetable Manure,	Jro. C. Rhoades & Co., Newton Square, ..	7.45
2156	{ Royal Fish Manure,	Edw. Brinton & Sons, West Chester, ..	8.22
3152	{ Sweet Potato Manure,	Edw. Brinton & Sons, West Chester, ..	8.21
3306	{ Trucker's High Grade Fish Guano,	S. Carl Garner, Hatboro,	9.84
2154	{ Trucker's High Grade Fish Guano,	Edw. Brinton & Sons, West Chester, ..	8.91

†Composite sample.

LIZERS—Continued.

Phosphoric Acid in 100 Lbs.					Potash in 100 Lbs.				Nitrogen in 100 Lbs.					Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of selection.
Available.			Total.		Present as murates.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive—Insoluble.	Total.			
Found.	Guaranteed.	Insoluble.	Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
8.13	8.00	1.33	9.51	.....	3.21	.....	3.21	3.00	1.02	1.53	1.33	1.56	1.65	25.96	27.00
8.64	8.00	1.67	10.31	.....	3.49	.....	3.49	3.00	2.29	3.77	1.73	4.55	4.11	40.87	23.50
9.30	9.00	1.67	10.97	.....	1.05	.....	1.05	1.00	.36	1.21	1.52	1.73	1.65	23.70	84.50
*11.79	12.00	2.06	13.85	.....	.09	1.19	1.28	1.00	.44	.66	1.23	.79	.82	19.51	22.80
*7.64	8.00	1.50	9.14	.....	3.17	.....	3.17	3.00	1.66	2.55	1.64	3.19	3.29	33.08	25.00
8.25	8.00	1.49	9.74	.....	2.25	.....	2.25	2.00	.86	1.12	1.44	1.56	1.65	24.21	31.50
6.11	5.00	.77	6.88	.....	2.98	.....	2.98	3.00	4.75	4.86	1.58	*6.44	8.00	45.82	22.00
7.99	8.00	1.65	9.64	.....	.93	.....	.93	1.00	.44	.60	1.32	.92	.82	28.44	48.25
12.87	12.00	2.92	15.79	.....	.08	.56	.64	.....	.70	1.23	1.25	1.48	1.65	25.02	21.50
8.24	8.00	1.26	9.50	.....	2.52	.....	2.52	2.00	.77	1.39	1.42	1.81	1.65	25.74	21.00
*8.86	10.00	.70	*9.56	11.00	.04	3.49	3.53	3.00	1.22	1.35	1.21	1.56	1.65	28.32	25.00
*10.06	11.00	.57	*10.63	11.50	3.39	.....	3.39	2.00	2.33	2.95	1.25	3.20	2.88	35.29	.....
*9.60	10.00	.85	10.45	10.50	1.55	.....	1.55	1.00	.52	.71	1.19	.90	.82	20.72	20.00
9.97	8.50	1.12	11.09	9.00	2.37	.....	2.37	1.50	.62	.78	1.23	1.06	1.00	23.52	19.00
10.83	10.00	1.04	11.87	10.50	.04	2.75	2.79	2.50	1.63	2.08	1.29	2.37	2.46	31.72	20.00
9.22	9.00	.80	10.02	9.50	3.66	.....	3.66	3.00	2.65	3.30	1.37	3.67	3.70	37.16	28.00
10.00	10.00	1.29	11.29	10.50	3.24	.....	3.24	3.00	1.34	1.62	1.26	1.83	1.65	29.32	33.00
1.49	.....	.22	1.71	.....	3.62	.....	3.62	2.00	7.52	7.59	1.20	*7.79	9.04	48.76	24.00
12.93	12.00	.80	13.73	12.50	2.20	.....	2.20	3.00	.35	.72	1.42	1.14	.82	26.17	23.00
*9.44	10.00	1.41	10.85	10.50	2.56	.....	2.56	3.00	.78	1.00	1.21	1.21	.82	24.26	20.00
10.10	9.00	.74	10.84	10.00	3.69	.....	3.69	3.00	.41	.79	1.32	1.11	.82	26.42	20.00
8.45	8.00	.54	8.99	9.00	1.49	.....	1.49	1.00	.....	.....	.....	.76	.82	13.75	21.00
8.71	8.00	1.82	10.53	9.00	10.44	.....	10.44	10.00	1.02	1.41	1.23	1.64	1.64	41.98	40.00
8.61	8.00	.86	9.46	9.00	2.99	.....	2.99	3.00	1.03	1.40	1.41	1.81	1.64	28.83	27.00
7.94	8.00	1.43	9.37	9.00	10.55	.....	10.55	10.00	2.54	3.12	1.33	3.45	3.23	49.48	45.00
9.23	8.00	1.28	10.51	9.00	5.10	.....	5.10	5.00	1.27	1.67	1.19	1.86	1.64	32.14	38.00
8.91	6.00	3.57	12.48	11.00	4.23	.....	4.23	4.00	.99	1.62	1.51	2.13	1.65	32.62	29.50
10.51	8.00	1.36	11.87	9.00	7.35	.....	7.35	7.00	1.71	2.22	1.27	2.49	2.47	40.90	33.50
8.66	8.00	1.14	9.80	9.00	1.40	.....	1.40	1.00	.68	.94	1.24	1.13	.82	21.09	24.00
8.16	8.00	1.31	9.47	9.00	2.52	.....	2.52	1.75	.75	1.06	1.23	1.34	.82	23.61	23.00
5.20	5.00	1.13	6.33	6.00	1.08	.....	1.08	1.00	.80	1.10	1.28	1.38	.82	18.08	21.00
*6.97	8.00	2.78	9.75	9.00	3.60	.10	3.70	3.00	2.06	3.08	1.35	3.43	3.30	35.30	35.00
9.11	8.00	.82	9.92	9.00	2.55	.....	2.55	2.00	2.36	2.91	1.40	3.31	3.30	33.27	32.00
6.88	7.00	1.54	8.42	8.00	2.67	1.00	3.67	2.00	1.33	2.27	1.43	2.70	2.46	31.36	30.00
7.92	7.00	1.29	9.21	8.00	1.59	.....	1.59	1.00	1.21	1.79	1.42	2.21	1.64	25.44	25.00
8.06	7.00	1.36	9.42	8.00	1.52	.....	1.52	1.00	1.08	1.64	1.47	2.01	1.64	24.48	25.00
8.77	7.00	1.61	10.38	8.00	2.36	.....	2.36	2.00	1.27	1.70	1.41	2.11	1.64	27.46	28.50
6.64	5.00	1.26	7.90	6.00	1.98	.....	1.98	1.75	2.30	3.05	1.47	*3.52	4.12	31.03	34.00

† † † Characters indicating the proportion of insoluble nitrogen that is inactive: †=two-fifths or less; ††=three-fifths to three-fifths; †††=three-fifths or more.
 *Constituents falls below guaranty.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
TUSCARORA FERTILIZER CO., BALTI-MORE, MD.			
3054	Ammoniated Phosphate,	H. D. Sittler, Trexlertown,	5.96
3055	Tuscarora's 1-9-3,	H. D. Sittler, Trexlertown,	5.76
3016	†Standard,	A. M. Frederick, Jr., Fairchance, ..	6.11
3057	Tuscarora's 3-5-3,	H. D. Sittler, Trexlertown,	6.23
3056		H. D. Sittler, Trexlertown,	
3017		A. M. Frederick, Jr., Fairchance, ..	
3053	†Tuscarora's 2-9-3,	H. D. Sittler, Trexlertown,	7.56
FOR THE J. E. TYGERT CO., PHILA. BY AM. AG. CHEM. CO., NEW YORK.			
2858	Golden Harvest Phosphate,	Lovine Lerch, Bethlehem, R. No. 3, ..	9.14
3115	Premium Manure,	R. F. Brown, Easton, R. No. 4, ...	8.21
2773	†Popular Phosphate,	David Green, Kunkletown,	7.78
3100	†Quaker Special,	S. R. Kline, Benton, R. D. No. 1, ..	7.70
2724		David Green, Kunkletown,	
2180		Hugh L. Carroll, Doylestown,	
3099	†Special Potato and Tomato Guano,	S. R. Kline, Benton, R. D. No. 1, ..	8.08
2352		Lovine Lerch, Bethlehem,	
3096		S. R. Kline, Benton, R. D. No. 1, ..	
3097	†Standard Fertilizer,	S. R. Kline, Benton, R. D. No. 1, ..	8.63
3108		J. Travers, East Stroudsburg,	
2854		Lovine Lerch, Bethlehem, R. No. 3, ..	
2381	†Revised Vegetable and Corn Fertilizer,	Hugh L. Carroll, Doylestown,	9.02
3074		Harry Sponeward, Berwick, R. D., ..	
VIRGINIA CAROLINA CHEMICAL CO., BALTIMORE, FOR RESALE BY RASIN MONUMENTAL CO.			
2394	V. C. O. Co's Standard Corn and Grain Grower,	McCalmont & Co., Bellefonte,	8.47
W. E. WHANN CO., PHILADELPHIA, PA.			
3357	Whann's Chester Valley Special Available Ammoniated Super Phosphate,	A. L. Miller, York, R. No. 1,	7.76
3300	Whann's Chester Valley Special Fish and Potash Fertilizer,	N. T. Sassaman, Ottsville,	8.72
3159	Whann's Chester Valley Special No. 3 Ammoniated Super Phosphate,	Frank Rees, Phoenixville, R. No. 3, ..	8.22
3302	Whann's Chester Valley Revised Special Ammoniated Super Phosphate,	N. T. Sassaman, Ottsville,	12.17
WOOLDRIDGE FERTILIZER CO., BALTI-MORE, MD.			
3253	Tiger Phosphate,	Grant Johnson, Millville,	7.32
THE ROBT. A. WOOLDRIDGE CO., BALTI-MORE, MD.			
2994	Wooldridge Special Triumph Brand Phosphate,	Bennage & Dershom, White Deer, ..	9.39
YORK CHEMICAL WORKS, YORK, PA.			
2223	†Golden Sheaf,	A. P. Lippy, Littlestown,	5.40
3021		Felix Lecher, Ashland,	
2353		Weaver & Callahan, Montoursville, ..	
2237	†Dempwolf's Harvest Queen,	Strazer Bros., York,	4.21
2134		Edw. F. Bracken, Paoli,	
2236		W. A. Cooper, Athens,	
2277	†Dempwolf's Plow Brand,	W. F. Guagey, Berlin,	4.32
3272		Preston Bros., Canton,	
2192		Thos. Haines & Co., Malvern,	
3020	†Dempwolf's Potato Manure,	Felix Lecher, Ashland,	4.73
2228		W. J. Sheffer, Hanover, R. No. 1, ..	
2367		A. T. Baird, Lock Haven,	
2185	†Dempwolf's Potato Special,	Edw. F. Bracken, Paoli,	5.91
2496		Geo. Edleman, Selgfrieds, R. No. 3, ..	
2926		W. J. Sheffer, Hanover,	
2190	†Dempwolf's Prosperity,	Thos. Haines Co., Malvern,	3.49
2283		W. F. Guagey, Berlin,	
†Composite sample.			

LIZERS—Continued.

Phosphoric Acid in 100 Lbs.					Potash in 100 Lbs.				Nitrogen in 100 Lbs.					Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at
Available.		Insoluble.	Total.		Present as murfata.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive—Insoluble.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
7.55	7.00	.56	8.11	7.50	1.30	.....	1.30	1.00	.44	.63	.25	.89	.82	18.21	18.50
9.43	9.00	.89	10.32	9.50	1.09	3.25	8.34	3.00	.50	.70	.28	.96	.82	25.24	22.00
8.15	8.00	1.02	9.17	8.50	1.86	.....	1.86	2.00	.82	1.24	.53	1.77	1.65	23.97	24.00
8.61	8.00	.99	9.60	8.50	2.00	1.53	3.53	3.00	1.09	1.50	.43	*1.93	2.47	29.13	24.00
9.24	9.00	.98	10.17	9.50	3.05	.....	3.05	3.00	.82	1.27	.46	1.73	1.65	27.37	26.00
															28.00
8.63	8.00	.17	*8.80	9.00	2.00	.....	2.00	2.00	.34	.....	.....	.54	.41	16.74	19.00
9.36	8.00	1.31	10.67	9.00	3.17	.....	3.17	3.00	1.03	1.32	.59	2.61	2.47	31.27	27.00
7.76	7.00	1.01	8.77	8.00	1.26	.....	1.26	1.00	.62	.77	.17	.94	.82	18.74	18.00
															18.25
8.72	8.00	1.22	9.94	9.00	3.33	.....	3.33	3.00	.69	.84	.17	1.01	.82	24.24	21.00
8.23	8.00	2.12	10.35	9.00	3.25	.....	3.25	3.00	1.28	1.67	.36	2.03	2.06	23.32	22.00
8.20	8.00	2.13	10.33	9.00	2.10	.....	2.10	3.00	.97	1.28	.25	1.53	1.65	24.16	26.50
															23.80
8.38	8.00	1.13	9.51	9.00	3.09	.....	3.09	3.00	1.12	1.45	.33	1.78	1.65	27.00	25.00
															24.00
9.33	8.00	1.25	10.63	9.00	2.32	.....	2.32	2.00	.60	.72	.10	.82	.41	21.80	21.00
7.46	7.00	1.08	8.54	8.00	3.50	.....	3.50	3.00	.73	.93	.20	1.13	1.03	24.02	21.00
*7.70	8.00	1.14	8.84	9.00	3.06	.....	3.06	3.00	1.14	1.49	.20	1.69	1.65	25.87	27.00
7.87	7.00	.96	8.83	8.00	3.30	.....	3.30	3.00	.91	1.12	.21	1.33	1.23	24.66	24.00
8.41	8.00	.93	9.34	9.00	2.15	.....	2.15	2.00	.74	.83	.15	.98	.82	21.87	21.00
10.03	9.00	.41	10.44	9.50	2.08	.....	2.08	2.00	.84	.97	.18	1.15	1.03	23.17	20.00
9.03	8.00	1.24	9.27	9.00	3.21	.....	3.21	3.00	1.24	1.36	.17	1.53	1.23	25.82	23.25
8.62	8.00	.83	9.45	8.50	1.82	.....	1.82	2.00	.20	.27	.23	.50	.28	18.50	18.00
8.43	8.00	.70	9.13	8.50	2.08	.....	2.08	2.00	.38	.59	.31	.90	.82	20.73	18.50
8.43	8.00	.77	9.20	8.50	2.04	.....	2.04	2.00	1.27	1.38	.23	1.61	1.65	23.85	22.00
7.81	7.00	.60	8.41	7.50	2.71	.....	*2.71	3.00	.86	1.03	.22	1.25	1.23	23.92	24.00
8.96	8.00	.67	9.62	8.50	2.67	.42	3.09	3.00	2.05	2.23	.28	2.51	2.47	30.61	27.75
8.33	8.00	1.63	10.01	8.50	.04	3.02	3.06	3.00	.46	.59	.30	.89	.82	23.76	21.00
															23.00

††† Characters indicating the proportion of insoluble nitrogen that is inactive: †=two-fifths or less; ‡=two-fifths to three-fifths; §=three-fifths or more.

*Constituents falls below guaranty.

COMPLETE FERTI

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
	YORK CHEMICAL WORKS, YORK, PA.— Continued.		
2368	Dempwolf's R. B. Special,	A. T. Baird, Lock Haven,	7.85
2278	} †Dempwolf's 2-2-2,	W. F. Guagey, Berlin,	} 3.36
2191		Thos. Haines Co., Malvern,	
2753		Mt. Holly Seed and Grain Co., Mt. Holly.	
2644	HENRY S. ZOOK, ELVERSON, PA. No. 6, Pride of Chester, Corn, Oats and Wheat Phosphate.	J. P. Stoltzfus, Elverson,	3.46

†Composite sample.

LIZERS—Continued

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.						Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs. at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive insoluble.	Total.				
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.			
10.89	10.00	1.05	11.94	10.50	1.20	2.33	3.53	3.00	1.23	1.43	†.32	1.75	1.65	30.51	30.00	
8.75	8.00	.57	9.32	8.50	2.89	.....	2.89	3.00	1.23	1.35	†.26	1.61	1.65	25.75	23.00 25.00 23.50
10.84	10.00	.74	11.58	11.00	2.00	.....	2.00	2.00	.28	.33	†.19	.52	.41	18.10	20.00

† † † Characters indicating the proportion of insoluble nitrogen that is inactive: †=two-fifths or less; †=two-fifths to three-fifths; †=three-fifths or more.
 *Constituents falls below guaranty.

ROCK AND POTASH

Furnishing Phosphoric

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK.			
2669 3404 2818 2808 3006 2055 2028 2829 2091	{Special Gem Alkaline Phosphate, †Bradleys Alkaline Phosphate and Potash, †Crocker's Dissolved Phosphate and Potash Crocker's Special Paragon Phosphate,	R. L. Homm, Spring Grove, Mrs. V. O. Martin, Loyersville, Smith & McKelvey, Blairsville, Athens Milling Co., Athens, F. T. Greenawalt, West Newton, T. R. Bolton, Cochran, Jos. Herb, Pittman, R. D., S. T. & I. W. Gibson, Indiana, Union City Coal and Supply Co., Union City, Grove & Uffelman, Parke, Davis & Hyde, Spartansburg,	{ 6.88 7.19 8.24 10.69 9.08 7.37
3050 2086	Lazaretto Dissolved Phosphate and Potash, Michigan Carbon Works Red Line Phos- phate with Potash,	J. W. Eberts, Clearfield, Sam'l F. McQuiston, Meadville,	{ 6.85 9.09
2414 2698 2772 2234 2626	{Milsom's Crown Phosphate, †Moro Phillips Alkaline Phosphate, Northwestern Special Horse Shoe Brand, Reese's Special Crown Phosphate and Pot- ash,	Nickles & Stewart, Shippensburg, .. Jeff Altfather, Berlin, D. F. Walker, Rockwood,	{ 8.06 6.71
2642 3400 2683	{Susquehanna Special High Grade Phos- phate and Potash, Tygert Allen's Star Soluble Phosphate and Potash,	Woy & Saylor, Somerset, G. E. Beaver, Millertown, Harvey Detwiler, Chester Springs,	{ 8.46 10.88
2246 2293 2447 3118 2396 2448 3368	{Wheeler's Special All Crop Grower, †Williams & Clark's Triumph Phosphate, .. †Zell's Electric Phosphate,	N. H. Blough, Davidsville, Geo. Decker, Athens, Isaac M. Sheetz, Sunbury R. No. 2 R. Milhelm, Nazareth, R. No. 2, ... B. F. Hummel, Shamokin Dam, Tressler Schlegel & Co., Red Cross, A. A. Ehrhart, Dallastown, R. No. 1	{ 10.42 8.41 7.28
AMERICAN FERTILIZING CO., BALTIMORE MD.			
2388 3318 2640 3367	{American Alkaline Super Phosphate, .. †Dissolved Phosphate and Potash,	John H. Niedigh, State College, .. B. R. Watson, Oxford, J. G. Emert, Somerset, J. D. Goldsmith, Williamson,	{ 8.25 8.56
ARMOUR FERTILIZER CO., BALTIMORE, MD.			
2557 2474 2585	{Phosphate and Potash No. 1,	Jacob Bowser, St. Clairsville, Fritz Bros., Garrett, Levi Stuckey, New Enterprise,	{ 7.82
ATLANTIC FERTILIZER CO., BALTIMORE, MD.			
3279	Atlantic Twelve and One,	Wysox Coal & Hay Co., Wysox, ..	7.10
ATLANTIC FERTILIZER WORKS, BALTI-MORE, MD.			
2289	Atlantic 12-2 Brand,	Lott Shoemaker, Nichols, N. Y., ..	10.32
BALTIMORE PULVERIZING CO., BALTI-MORE, MD.			
2230	Special Spring and Fall Mixture,	J. C. Royer, Myerstown, R. No. 4, ..	7.55
BAUGH & SONS CO., PHILADELPHIA, PA.			
2406 2224 2012 2350	{Baugh's High Grade Potash Mixture, †Baugh's Soluble Alkaline Super Phos- phate,	R. D. Forman, Centre Hall, Humbert & Krug, Littlestown, W. W. Haas, Pittman, R. D., J. F. Stier, Johnsonville,	{ 7.88 7.43
BERGER BROS., EASTON, PA.			
2735	Peerless Phosphate,	John Kuntzman, Easton,	8.41

†Composite sample.

FERTILIZERS.

Acid and Potash.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.		
10.72	10.00	1.17	11.90	11.00	1.22	.....	1.25	1.00	14.62	{ 14.00
10.55	10.00	1.08	11.63	11.00	2.22	.....	2.22	2.00	16.22	{ 18.00
10.27	10.00	.08	10.95	11.00	1.85	.....	1.85	2.00	15.12	{ 12.00
12.20	12.00	.77	12.97	13.00	2.17	.....	2.17	2.00	17.02	{ 17.25
10.34	10.00	.94	11.28	11.00	2.06	.....	2.06	2.00	16.87	{ 15.00
10.00	10.00	.72	*10.72	11.00	2.02	.....	2.02	2.00	15.45	{ 18.00
10.69	10.00	.87	11.56	11.00	1.90	.....	1.90	2.00	15.79	{ 17.50
10.41	10.00	.85	11.26	11.00	2.06	.....	2.06	2.00	15.66	{ 14.00
12.15	12.00	.56	*12.71	13.00	2.48	.....	2.48	2.00	17.55	{ 17.10
12.75	12.00	1.11	12.96	13.00	2.52	.....	2.52	2.00	18.22	{ 15.00
12.42	12.00	.75	12.17	12.00	1.91	.....	1.91	2.00	16.64	{ 15.00
10.89	10.00	.48	11.87	11.00	2.19	.....	2.19	2.00	16.20	{ 17.50
14.68	14.00	.50	15.16	15.00	2.00	.....	2.00	2.00	18.48	{ 19.00
9.96	10.00	1.19	11.15	11.00	2.12	.....	2.12	2.00	15.64	{ 20.00
10.34	10.00	.87	11.21	11.00	2.10	.....	2.10	2.00	15.72	{ 15.00
8.25	8.00	1.42	9.67	9.00	2.00	.....	2.00	2.00	14.26	{ 16.50
10.17	10.00	1.50	11.67	11.00	2.02	.....	2.02	2.00	15.54	{ 12.00
9.86	10.00	.70	10.56	10.50	2.02	.....	2.02	2.00	15.15	{ 15.00
*11.22	12.00	1.79	12.11	.....	1.20	.....	1.20	1.00	14.74	{ 16.50
*11.45	12.00	.89	12.34	.....	2.25	.....	2.25	2.00	16.77	{ 12.00
10.42	8.00	.94	11.26	.....	2.16	.....	2.16	1.00	15.83	{ 15.00
12.10	12.00	.82	12.92	.....	2.19	.....	2.19	2.00	17.72	{ 16.50
11.00	10.00	.82	11.82	.....	2.42	.....	2.42	2.00	16.94	{ 12.00
10.96	10.00	1.08	12.04	11.00	2.42	.....	2.42	2.00	17.61	{ 17.00

*Constituents falls below guaranty.

ROCK AND POTASH

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
	BOWKER FERTILIZER CO., BOSTON.		
2059	{†Bowker's Special Golden Harvest Fertilizer.	Jas. E. Wheeling, Cochran, R. D. Harvey W. Hess, Benton, R. No. 5, H. L. Stults & Bro., Altoona,	10.28
2247			
2519			
	S. B. BRODBECK, BRODBECK, PA.		
2029	Brodbeck's Alkaline,	S. B. Brodbeck, Brodbeck,	7.23
	CENTRAL CHEMICAL CO., THOMAS FERTILIZER WORKS, HAGERSTOWN, MD.		
2363	C. C. C. Commonwealth,	L. H. Leiter & Bro., Greencastle R. No. 2	5.71
2385	C. C. C. Potash Special,	Jno. W. Bathgate, State College, ..	11.00
	CONSUMER'S CHEMICAL CORPORATION, NEW YORK.		
2300	{†Consumer's High Grade Phosphate and Potash.	Martin Allyn, Nichols, N. Y., R. No. 2	9.51
2243			
2073			
2572	{†Consumer's Pure Sure Phosphate and Potash.	H. F. Gump & Son, Everett,	6.24
2078			
2422			
2239	{†Consumer's Special Phosphate and Potash.	Zehner Bros., Bloomsburg,	9.44
2537			
	JOSIAH COPE & CO., BALTIMORE, MD.		
2487	Soluble Phosphate and Potash,	J. O. Henderson, Petersburg, R. D.,	3.14
	EUREKA CHEMICAL CO., BALTIMORE, MD.		
2558	{†Eureka Alkaline,	D. B. Dimm, Thompsonstown	3.63
2060			
2033	Eureka Alkaline No. 2,	Jonas P. Acker, Breiningsville,	3.65
	FARMER'S FERTILIZER WORKS, ELIZABETHTOWN, PA.		
2295	{†Farmer's Economy,	B. F. Horting, Newport,	3.23
2296			
2759			
	GRIFFITH & BOYD CO., BALTIMORE MD.		
2295	Alkaline Mixture,	Adam Krugg, Allenwood,	7.94
2702			
2871			
2414			
	W. S. HASTINGS & SON, ATGLEN, PA.		
2663	Rock and Potash,	Wm. S. Hastings & Son, Atglen, ..	3.25
	S. M. HESS & BRO., PHILADELPHIA, PA.		
2243	{†Climax Alkaline Fertilizer,	Edw. F. Miller, Somerset,	9.63
2402			
2204			
2552			
2241	{†Soluble Phosphate and Potash,	H. N. Carpenter, Wellsboro,	7.43
2176			
	P. HOFFMAN & BRO., RAUBSVILLE, PA.		
2304	Hoffmans Oats,	P. Hoffman & Bro., Raubsville, ..	3.00
	HUBBARD FERTILIZER CO., BALTIMORE, MD.		
2232	{Alkaline 10-1,	J. Emery Maul, Iron Ore,	10.69
2275			
2230			
2226			
2229			
2229			
2278			
		Geo. Pantol, White Pine,	10.69
		J. Emery Maul, Iron Ore,	10.69
		D. H. Fair, New Buena Vista,	10.31
		J. Emery Maul, Iron Ore,	10.31
		Union H'd'w. Co., Middletown,	10.31

†Composite sample.

FERTILIZER—Continued.

Phosphoric Acids in 100 Pounds.					Potash in 100 Pounds.				Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.		
12.46	12.00	1.34	12.70	12.00	2.78	.....	2.78	2.00	12.54	{ 12.75 12.00 16.00
10.12	10.00	1.05	11.22	11.00	1.42	.....	1.42	1.00	14.24	16.00
8.80	8.00	1.25	10.05	9.00	2.25	.....	2.25	2.00	15.10	14.00
10.32	11.00	.50	11.42	.....	.86	.....	.86	1.00	12.41	15.00
12.86	14.00	.44	14.20	.....	2.04	.....	2.04	2.00	17.24	.....
17.54	16.00	.90	12.44	17.00	2.59	.....	2.59	2.00	21.50	{ 20.00 22.75
9.50	9.00	1.12	10.77	10.00	1.72	.....	*1.72	2.00	14.48	{ 12.00 15.00 12.75
12.49	12.00	1.21	12.80	12.00	2.28	.....	2.28	2.00	17.06	{ 17.00 15.00
10.71	10.00	.64	11.35	11.00	2.58	.....	2.58	2.00	16.98	.....
12.21	12.00	1.02	12.22	12.50	1.22	.....	1.22	1.00	15.26	{ 17.00 16.50
12.02	11.00	.89	12.91	11.50	1.90	.....	1.90	2.00	16.41	.....
11.22	10.00	1.40	12.62	.....	2.27	.....	2.27	2.00	16.72	{ 14.50 15.00 12.00
10.17	10.00	1.20	11.47	.....	2.41	.....	2.41	2.00	18.24	12.00
9.97	10.00	.41	11.24	.....	1.13	.....	1.13	1.00	12.51	12.00
9.22	8.00	1.74	10.97	9.00	1.40	.....	1.40	1.00	12.75	14.00
12.57	12.00	1.22	12.85	12.00	2.46	.....	2.46	2.00	12.00	17.00
11.04	10.00	2.07	12.11	11.00	1.74	.....	1.74	2.00	15.76	16.00
10.83	10.00	.41	11.24	.....	2.12	.....	2.12	2.00	16.05	14.00
14.25	14.00	.23	15.12	15.00	2.22	.....	2.22	2.00	18.55	{ 12.50 12.00 12.50 17.00 12.00 12.00
9.97	10.00	.89	10.86	11.00	2.24	.....	2.24	2.00	17.22	12.00
8.22	8.00	1.62	10.44	10.00	2.11	.....	2.11	2.00	14.91	16.00
12.02	10.00	2.17	14.19	11.00	1.09	.....	1.09	1.00	15.12	14.50
12.11	12.00	2.61	14.72	12.00	1.15	.....	1.15	1.00	15.37	{ 12.00 12.00
*11.94	12.00	2.22	14.46	12.00	2.08	.....	2.08	2.00	17.01	{ 12.00 12.00

*Constituents falls below guaranty.

ROCK AND POTASH

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
	INTERNATIONAL AGRICULTURAL CORPORATION, BUFFALO FERT. WKS., BUFFALO.		
2096 2272	}†Buffalo Twelve-Two,	Penn Distributing Co., Union City, Ed. Frazier, Shanksville,	8.26
2542	JARECKI CHEMICAL CO., SANDUSKY, O. Super Phosphate and Potash,	E. J. Cass, Harbor Creek,	12.97
3479	KEYSTONE GRANGE EXCHANGE, MANE-FIELD, PA. Granger's Buckwheat Special,	L. A. Pidcoe, Linden, R. No. 2,	6.82
3552	THE LANCASTER CHEMICAL CO., LANCASTER, PA. No. 10 Economist,	New Providence Coal Co., New Providence,	6.14
	LISTER'S AGRICULTURAL CHEMICAL WORKS, NEWARK, N. J.		
2226 2069 2765 2468 2564	}†Lister's Revised Grain and Grass Fertilizer,	J. C. Ernst, York,	6.91
	}†Lister's Special Alkaline Fertilizer,	F. P. Allen & Co., Titusville, .. Isaac Plasterer, Lebanon, R. D., .. S. J. Ringler, Elk Lick, .. Jacob Bowser, St. Clairsville,	9.01
2578 2342 3237	PATAPSCO GUANO CO., BALTIMORE, MD. }†PatapSCO Soluble Phosphate and Potash,	J. N. Hersh, New Oxford,	9.66
		Chas. Shimmel, Ackermanville, .. Briggs Bros., Mt. Union,	
2444 2235 3209	PIEDMONT MT. AIRY GUANO CO., BALTIMORE, MD. }†Piedmont Farmers Potash Mixture,	R. I. Reiger, Herndon,	7.15
		H. H. Loose, Menges Mills,	
		R. S. Brown, Morris,	
2918 2677	RASIN' MONUMENTAL CO., BALTIMORE, MD. Rasins Big Sixteen Alkaline Compound,	Siegfried & Schwoyer, Kempton, .. S. C. Walker & Co., Chadds Ford Junction,	10.51
2111 2700 3003 3091	}†Rasins Corn Buckwheat and Tomato Special,	Geo. E. Buck, Krumsville,	6.14
	}†Rasins Phosphate and Potash Fertilizer,	E. A. Slagle, Paxinos,	6.91
		H. S. Kramer, Kramer,	
		H. D. Miller, Middletown,	
3164	READING CHEMICAL CO., READING, PA. High Grade Phosphate and Potash,	John W. Root, Kimberton,	9.09
2617	ROBERT A. REICHARD, ALLENTOWN, PA. Ideal Phosphate,	W. J. Gehringer, Seagersville,	8.85
3077 2319	F. S. ROYSTER GUANO CO., BALTIMORE, MD. Royster's Alba Compound,	C. C. Davis, Greensburg,	6.53
2063 2367 2435 2427 2490	}†Royster's Cloverdale Grain and Grass Grower,	S. A. Phillippy, Schaefferstown, E. No. 1,	8.07
	}†Royster's Harmony Compounds,	W. C. Work & Son, Cochranston, .. J. N. Getz Co., Lock Haven,	9.92
		W. S. Opp, Opp,	
		Wm. Biller, Patton,	
		John Kunkel, Bath,	
3122	THE SCOTT FERTILIZER CO., ELKTON, MD. Scott's Soluble Phosphate and Potash 12-2,	S. Applegate, Bethlehem,	9.43
3326	SMITH'S AGRICULTURAL CHEMICAL CO., COLUMBUS, O. Smith's Soluble Phosphate and Potash, ..	Girard Coal & Supply Co., Girard, ..	7.36

†Composite sample.

FERTILIZER—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.		
12.55	12.00	.79	12.24	12.00	1.96	.....	1.96	2.00	16.88	{ 21.00 18.75
*11.49	12.00	.75	*12.24	12.00	2.24	.....	2.24	2.00	16.98	18.00
10.40	10.00	1.29	11.79	11.00	2.16	.....	2.16	2.00	15.99	14.00
*9.50	10.00	.28	*9.28	11.00	2.23	.....	2.23	2.00	15.37	15.50
9.85	10.00	1.25	11.10	11.00	2.26	.....	2.26	2.00	16.00	{ 16.00 18.00 17.00
12.11	12.00	.73	12.84	12.00	2.29	.....	2.29	2.00	17.47	{ 19.00 16.70
10.23	10.00	.66	10.94	11.00	2.60	.....	2.60	2.00	16.66	{ 14.00
10.43	10.00	.23	10.81	.....	1.90	.....	1.90	2.00	15.23	{ 15.00 15.00 17.00
17.07	16.00	1.23	18.45	17.00	2.26	.....	2.26	2.00	20.79	20.00
7.40	7.00	1.01	8.41	8.00	2.42	.....	2.42	2.00	14.53	{ 13.50 13.00 15.00
10.23	10.00	1.40	11.73	11.00	2.10	.....	2.10	2.00	15.85	{ 15.75 17.50
11.96	12.00	.49	12.45	.....	1.97	.....	1.97	2.00	16.29	20.00
10.23	10.00	.62	11.00	11.00	1.96	.....	1.96	2.00	15.49	16.00
12.22	11.00	.87	13.09	11.50	1.22	.....	1.22	1.50	16.26	18.00
11.47	10.00	.86	12.23	10.50	2.23	.....	2.23	2.00	16.89	{ 15.50 17.25 16.50
12.55	12.00	1.26	13.91	12.50	2.05	.....	2.05	2.00	17.19	{ 16.75 18.50
13.59	12.00	.91	14.50	.....	2.33	.....	2.33	2.00	19.41	.....
10.90	10.00	.45	11.35	.....	2.70	.....	2.70	2.00	17.22	17.00

*Constituents falls below guaranty.

ROCK AND POTASH

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
2365	SWIFT & CO., BALTIMORE, MD. Swift's Pure Special Phosphate and Potash	Albert C. Myers, Lock Haven,	5.77
2367	{†Swift's Pure Twelve and One Brand, ..}	Reed & Erdman, Paxinos,	4.96
2435	{†Swift's Pure Twelve and Two Brand, ..}	Kemmer & Co., Lehighton,	7.13
2395		Penn Distributing Co., Union City, ..	
2582		J. R. Weaver & Bro., New Oxford, ..	
	I. P. THOMAS & SONS CO., PHILADELPHIA, PA.		
2581	{†Special Alkaline Manure,	J. H. Duttera, New Oxford,	11.22
2315		Ed. Shuey, Lickdale, R. No. 1, ..	
2758		E. S. Risser, Palmyra, R. No. 2, ..	
	FOR J. E. TYGERT CO., PHILA., BY AM. AG. CHEM. CO., NEW YORK.		
2245	{Tygert's Clover Leaf Phosphate,	S. R. Kline, Benton, R. No. 1,	11.09
3722	{†Soluble Phosphate and Potash,	Clinton Kunkel, Kresskyville,	5.15
3039		Geo. S. Miller, Millinville,	
	VIRGINIA CAROLINA CHEMICAL CO., FOR RESALE BY THE BASIN MONUMENTAL CO., BALTIMORE, MD.		
2395	{V. C. C. Co's Giant Alkaline Grain Grower, ..}	McCalmet & Co., Bellefonte,	9.96
2586	{V. C. C. Co's Peerless Phosphate and Potash, ..}	J. R. Weaver & Bro., New Oxford, ..	9.51
2585	{V. C. C. Co's 16 and 2 Alkaline Crop Grower, ..}	J. R. Weaver & Bro., New Oxford, ..	7.41
	W. E. WHANN CO., PHILA., BY AM. AG. CHEM. CO.		
2464	{Whann's Alkaline Phosphate,	S. P. Schnaln, Valley View,	8.62
	ROBT. A. WOOLRIDGE CO., BALTIMORE, MD.		
2555	{†Woolridge's German Potash Mixture, ..}	V. A. Stuft, Imler,	9.05
2359	{Woolridge's Special No. 1 Phosphate and Potash, ..}	H. V. Smith, Turbotville,	10.71
2554	{Woolridge's Special Liberty Belle Potash Mixture, ..}	V. A. Stuft, Imler,	7.21
2471		Grant Sechler, Salisbury,	
	WOOLRIDGE FERTILIZER CO., BALTIMORE, MD.		
2267	{Virginia Belle,	Hill & Walker, Shanksville,	8.93
	YORK CHEMICAL WORKS, YORK, PA.		
2227	{Dempwolf's Black Cross,	M. J. Sheffer, Hanover,	8.54
2296	{†Dempwolf's Phosphate and Potash, ..}	W. A. Cooper, Athens,	7.71
2271		A. P. Lippy, Littlestown,	
2398		Elmer Musser, State College,	
2282		W. Guagey, Berlin,	7.89

†Composite sample.

FERTILIZER—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.		
10.16	10.00	1.35	11.51	.....	2.10	.....	2.10	2.00	15.70	17.00
12.71	12.00	1.53	14.24	.....	.94	.....	.94	1.00	15.10	17.00
*11.70	12.00	1.18	12.88	.....	2.02	.....	2.02	2.00	16.50	12.50 21.00 17.00
12.04	12.00	.86	12.90	12.50	2.36	.....	2.36	2.00	17.36	17.00 17.50 17.00
*12.43	14.00	1.39	*12.82	15.00	2.02	.....	2.02	2.00	19.08	18.50
10.47	10.00	1.63	12.15	11.00	2.35	.....	2.35	2.00	16.51	..... 17.50
15.07	14.00	1.43	16.55	15.00	2.57	.....	2.57	2.00	19.90	21.00
10.14	8.00	1.16	11.30	9.00	2.29	.....	2.29	2.00	16.06	14.00
17.42	16.00	1.28	18.70	17.00	2.64	.....	2.64	2.00	21.61	19.00
*9.78	10.00	.63	*10.41	11.00	2.46	.....	2.46	2.00	16.02	17.00
10.25	10.00	.83	11.08	11.00	2.00	.....	2.00	2.00	15.45	13.50 16.00
10.54	10.00	.87	11.41	11.00	1.50	.....	1.50	1.00	14.62	15.50
12.67	12.00	.42	13.09	13.00	2.38	.....	2.38	2.00	17.78	18.75
*11.79	12.00	.94	12.73	12.50	2.61	.....	2.61	2.00	17.72	17.50
10.14	10.00	.89	11.03	10.50	1.83	.....	1.83	2.00	15.19	16.00 16.45
10.67	10.00	.51	11.18	10.50	1.96	.....	1.96	2.00	15.57	16.00 15.50
13.05	12.00	.48	13.53	12.50	2.13	.....	2.13	2.00	17.53	16.65

*Constituents falls below guaranty.

DISSOLVED BONE

Furnishing Phosphoric

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
2404	BAUGH & SONS CO., PHILADELPHIA, PA. Baugh's, The Old Stand-By (Dissolved Animal Bone).	R. D. Foreman, Centre Hall,
2141	Baugh's Pure Dissolved Animal Bones, ..	Jas. G. Kauffman, Dauberville,
2842	CENTRAL CHEMICAL CO., THOMAS FERTILIZER WORKS, HAGERSTOWN, MD. C. C. C. Dissolved Bone,	Swank Bros., Somerset,
3025	EUREKA CHEMICAL CO., BALTIMORE, MD. Eureka Dissolved Bone,	C. C. Davis, Greensburg,
2873	GRIFFITH & BOYD CO., BALTIMORE, MD.	J. E. Scarborough & Son, Delta,
2958	†Fish and Bone Mixture,	F. A. Meyers, Hooversville,
2951	Griffith & Boyd Co's. Pure Dissolved Animal Bone.	Willis C. Herr, Strausburg,
2948		Willis C. Herr, Strausburg,
3239	LISTER'S AGRICULTURAL CHEMICAL WORKS, NEWARK, N. J. Lister's Celebrated Ground Bone and Tankage, Acidulated.	Dekin & Ash, Susquehanna,
2443	MARTIN FERTILIZER CO., PHILADELPHIA, PA. Martin's Dissolved Animal Matter,	G. W. Wynn, Sunbury, E. F. D.,
3139	F. W. TUNNELL & CO., INC., PHILADELPHIA, PA. Raw and Acidulated Animal Compound, ..	John C. Rhodes & Co., Newton Square,

†Composite sample.

*Constituent falls below guaranty.

FERTILIZERS.

Acid and Nitrogen.

Moisture in 100 pounds.	Phosphoric Acid in 100 Pounds.					Nitrogen in 100 Pounds.					Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of selection.
	Available.		Insoluble.	Total		Water soluble.	Available.	Inactive-Insoluble.	Total.			
	Found.	Guaranteed.		Found.	Guaranteed.				Found.	Guaranteed.		
6.89	13.19	12.00	1.98	15.17	.....	1.04	1.39	a.13	1.51	1.65	23.88	\$35.00
4.73	14.08	13.00	1.41	15.49	.....	1.19	1.97	a.43	2.39	2.06	27.51	25.00
7.39	13.13	13.00	1.17	14.30	.....	1.63	2.01	a.20	2.21	2.05	25.63	34.00
4.57	12.47	11.00	1.49	13.96	11.50	1.56	1.73	a.11	1.34	1.65	23.56	28.00
6.77	9.77	9.00	.73	10.50	10.00	.51	.85	b.39	*1.24	1.50	17.43	{ 20.00 23.00 23.00 23.00
6.91	10.89	10.00	5.19	16.08	11.00	1.52	1.87	b.27	2.14	2.00	25.32	
4.79	9.01	.....	2.30	12.31	12.00	1.81	2.34	a.13	2.97	2.67	26.34	29.00
6.84	*11.77	12.00	1.44	13.21	.....	1.33	1.68	a.23	1.91	1.65	23.13	21.00
4.63	12.09	10.00	6.77	*13.86	20.00	1.10	1.63	a.26	1.89	1.64	26.00	26.00

a, b, c: Letters indicating the proportions of insoluble nitrogen that is inactive: a—2/5 or less; b—2/5 to 3/5; c—3/5 or more.

ACIDULATED Furnishing

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
	AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK.	
2615	Wheeler's Peerless Acid Phosphate,	W. S. Snyder, Rockland, R. F. D. No. 2, ..
2704	{ 16% Acid Phosphate,	J. A. Kimbel, Elysburg,
2690		A. M. F. Stifeler, Uwchland,
2786		L. F. Harris, 215 N. 2nd St., Harrisburg, ..
	AMERICAN FERTILIZING CO., BALTI-MORE, MD.	
2339	High Grade Acid Phosphate,	John H. Neidigh, State College,
	ARMOUR'S FERTILIZER WORKS, BALTI-MORE, MD.	
2204	Acid Phosphate,	Orwell Grange, Orwell,
2288	{ Star Phosphate,	Louck's Hardware Co., Scottsdale,
2227		P. J. Cover & Sons, Meyersdale,
2321		H. E. Huston, Saltillo,
	ATLANTIC FERTILIZER CO., BALTIMORE, MD.	
3419	Atlantic Dissolved Phosphate, 16%,	Cove Lumber Co., Marysville,
	BALTIMORE PULVERIZING CO., BALTI-MORE, MD.	
2325	{ S. C. Phosphate,	J. C. Royer, Myerstown, R. F. D. No. 4, ..
3256		J. G. Washburne, Millville,
	BAUGH & SONS CO., PHILADELPHIA, PA.	
2633	{ Baugh's 16% Acid Phosphate,	W. P. Hay, Somerset,
2193		Brillinger & Swarts, Emigsville,
2833		Edwards Hardware Co., Ebensburg,
	For S. B. BRODBECK, BRODBECK, PA.	
2834	Brodbeck's Ruth Dissolved Phosphate, 14%,	S. B. Brodbeck, Brodbeck's,
	CONSUMERS' CHEMICAL CORPORATION, NEW YORK.	
2424	{ Consumers' High Grade Acid Phosphate, ..	Chas. Yeackle, Patton,
2505	{ Consumers' Pure Sure Acid Phosphate, ..	Arthur L. Kniff, Ulster,
3221		H. F. Gump & Son, Everett,
3236		C. E. Starr, Three Springs,
	COE MORTIMER CO., NEW YORK.	
2585	{ E. Frank Coe's High Grade Souble Phos- {	C. B. Farr, North East,
2673	phate,	Geo. J. New, Blairsville,
2308	E. Frank Coe's 16% Super Phosphate,	C. J. Estabrook, Rummerville, R. F. D., ..
	HENRY COPE & CO., LINCOLN UNIVER-SITY, PA.	
2147	Acid Phosphate,	S. K. Chambers & Bro., West Grove,
	FARMERS' FERTILIZER WORKS, ELIZA-BETHTOWN, PA.	
2763	Acid Phosphate,	Ben Garman, Elizabethtown,
	W. S. FARMER & CO., BALTIMORE, MD.	
2480	Dissolved S. C. Phosphate,	J. E. Sipe, Rockwood,
	GRIFFITH & ROYD CO., BALTIMORE, MD.	
2872	{ Griffith & Royd Co's. High Grade Acid {	J. R. Scarborough & Son, Delta,
2844	Phosphate,	Willis C. Herr, Strausburg,
	W. S. HASTINGS & SON, ATGLEN, PA.	
2667	Clear Acid Phosphate,	Wm. S. Hastings & Son, Atglen,
	S. M. HESS & BRO., PHILADELPHIA, PA.	
3222	{ High Grade Acid Phosphate,	Ira Price, Everett R. F. D.,
3268		Harry Shipman, Hughesville R. F. D., ...

†Composite sample.

ROCK PHOSPHATE.

Phosphoric Acid.

Moisture in 100 pounds.	Phosphoric Acid in 100 Pounds.					Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of selection.
	Available.		Insoluble.	Total.			
	Found.	Guaranteed.		Found.	Guaranteed.		
2.09	15.00	14.00	.87	16.47	15.00	13.70	\$14.00
5.53	16.63	16.00	1.09	17.77	17.00	14.46	15.00
							13.50
						
9.29	15.53	14.00	1.17	16.79	15.00	13.74	13.50
16.77	16.02	16.00	.68	16.10	16.50	13.73	13.90
7.33	14.79	14.00	.45	15.24	14.50	13.08	17.00
							13.50
4.53	17.33	16.00	1.30	19.13	.....	15.23	.....
9.56	17.08	16.00	.44	17.47	.....	14.56	14.00
							13.00
8.53	17.06	16.00	.68	17.91	.....	14.63	15.00
							13.00
7.62	15.75	14.00	1.67	16.83	15.00	13.84	13.00
7.64	17.77	16.00	1.34	19.01	17.00	15.31	14.00
8.63	15.17	14.00	.39	16.06	15.00	13.41	13.50
							13.00
4.40	14.77	14.00	1.31	16.08	15.00	13.23	14.00
6.43	15.87	16.00	1.66	17.53	17.00	14.10	17.00
							12.50
9.19	15.73	14.00	1.31	17.09	.....	13.94	12.00
8.58	15.31	14.00	.33	15.64	.....	13.39	.....
5.55	15.56	14.40	.43	16.04	15.00	13.58	12.50
10.71	14.99	14.00	.34	15.33	15.00	13.13	12.00
							14.00
9.10	15.37	14.00	.51	16.33	.....	13.32	12.00
7.92	14.44	14.00	1.91	16.35	15.00	13.20	13.50
							13.50

*Constituents falls below guaranty.

ACIDULATED ROCK

Sample number.	Manufacturer and Brand.		From Whom Sample Was Taken.	
	HUBBARD FERTILIZER CO., BALTIMORE, MD.			
2560	{	Hubbard's 16% Phosphate,	{	W. Howard Burket, Alum Bank,
2221				J. Emery Maul, Iron Ore,
3157				John Hicks, Avondale,
	M. P. HUBBARD & CO., BALTIMORE, MD.			
3084	{	Hubbard's Dissolved Phosphate,	{	D. C. Shuman, Bloomsburg,
2116				L. A. Geiger, Joanna,
	INTERNATIONAL AGRICULTURAL CORPORATION, BUFFALO FERTILIZER WORKS, BUFFALO, N. Y.			
2073	{	Buffalo Dissolved Phosphate,	{	H. B. Edwards, Titusville,
3213				Snyder Bros., Liberty,
	JARECKI CHEMICAL CO., SANDUSKY, O.			
2477	{	C. O. D. Phosphate,	{	S. S. Mosholder, Rockwood,
2541				E. J. Cass, Harbor Creek,
	KEYSTONE GRANGE EXCHANGE, MANSFIELD, PA.			
3107	{	Grangers' 16% Acid Phosphate,	{	Edgar V. Bensley, Egypt Mills,
	LANCASTER CHEMICAL CO., LANCASTER, PA.			
3551	{	No. 8 Acid Phosphate,	{	New Providence Coal Co., New Providence,
	LEBANON FERTILIZER WORKS, LEBANON, PA.			
3253	{	Levan's Acid Phosphate,	{	W. W. Parker, Rohrsburg, R. F. D. No. 1,
	NITRATE AGENCIES CO., NEW YORK.			
2077	{	High Grade Acid Phosphate, 16%,	{	W. H. Stout, Pine Grove,
2313				H. H. Hess, Lickdale,
2157				Edw. Brinton & Sons, West Chester,
	NORTHWAY & PECK, EAST ORWELL, O.			
3350	{	16% Available Phosphoric Acid,	{	D. H. Rodgers, Pardoe,
	PATAPSCO GUANO CO., BALTIMORE, MD.			
2577	{	Patapasco Pure Dissolved S. O. Phosphate,	{	J. N. Hersh, New Oxford,
	PIEDMONT MT. AIRY GUANO CO., BALTIMORE, MD.			
3243	{	Piedmont 14% Acid Phosphate,	{	Jno. G. Simpson, Huntingdon,
3406				J. M. Dunn, New Bloomfield,
	POLLOCK FERTILIZER CO., BALTIMORE, MD.			
3225	{	The Pollock Fertilizer Co's. High Grade Super Phosphate,	{	John L. Barts, Bedford,
	RASIN MONUMENTAL CO., BALTIMORE, MD.			
2336	{	Rasin's Sea Wall Special,	{	Eliaz S. Brubacher, Richland,
2679				S. C. Walker & Co., Chadds Ford Jct.,
	READING BONE FERTILIZER CO., READING, PA.			
2917	{	14% Acid Phosphate,	{	Wm. Willets, Calcium,
2601				F. A. Scheler, Slatington,
3019				A. M. Frederick, Jr., Fair Chance,
	F. S. ROYSTER GUANO CO., BALTIMORE, MD.			
2252	{	Royster's 14% Acid Phosphate,	{	Blough & Yoder, Holsopple,
2063				Thos. Kuntzleman, Orwin,
2711				N. C. Creasy, Catawissa,
2492				John Kunkel, Bath,
2425				Wm. Biller, Patton,
2799				W. J. Grover & Son, Newfield,

†Composite sample.

PHOSPHATE—Continued.

Moisture in 100 pounds.	Phosphoric Acid in 100 Pounds.					Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of selection.
	Available.		Insoluble.	Total			
	Found.	Guaranteed.		Found.	Guaranteed.		
9.36	15.85	16.00	2.55	18.40	17.00	14.23	{ 12.50 13.00
9.13	15.91	16.00	2.11	18.02	17.00	14.20	14.60
7.37	15.58	14.00	.43	16.00	15.25	13.59	13.00
7.37	14.66	14.00	.77	15.43	15.00	13.05	16.00
9.89	17.79	16.00	.05	18.44	17.00	15.10	16.00
12.31	13.93	14.00	1.15	15.07	15.00	13.86	{ 15.00 15.00
6.64	13.21	16.00	.33	19.14	17.00	15.44	15.00
9.07	14.30	14.00	.41	14.71	15.00	13.74	13.50
7.51	15.16	14.00	.30	15.96	15.00	13.39	13.75
7.33	16.66	16.00	.79	17.45	17.00	14.33	{ 12.00
6.27	16.31	14.00	.61	17.42	15.00	14.43	{ 13.00
8.51	16.68	16.00	.70	17.38	.....	14.40	13.50
6.32	*13.23	14.00	1.79	15.07	15.00	13.40	15.00
7.35	16.36	14.00	.30	17.25	.....	14.20	{ 14.00
10.22	17.22	16.00	1.00	18.31	17.00	14.32	15.00
6.21	10.84	10.00	.97	11.81	11.00	10.59	{ 12.00
5.97	11.23	14.00	1.54	15.77	15.00	12.98	{ 12.00 12.00 16.00
6.34	15.30	14.00	1.25	16.55	14.50	13.60	{ 15.00 15.00 14.00
9.19	*15.73	16.00	1.23	17.06	16.50	13.98	{ 14.50 16.00

*Constituents falls below guaranty.

ACIDULATED ROCK

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
2420	SWACK'S FERTILIZER WORKS, DUBOIS, PA. Swack's Acid Phosphate,	Chas. Yeackle, Patton,
2583 2093 3154	SWIFT & CO., CLEVELAND, D. }†Swift's Pure Garden City Phosphate,{	{ J. R. Weaver & Bro., New Oxford, } { Penn Distributing Co., Union City, } { Wm. C. Ball, Media, }
2672	J. M. TEMPLIN, HONEYBROOK, PA. No. 5 High Grade Acid Phosphate,	J. M. Templin, Honeybrook,
2580 3245	I. P. THOMAS & SONS CO., PHILADELPHIA, PA. }†16% Acid Phosphate,{	{ J. H. Duttera, New Oxford, } { Wm. J. Moyer, Greenville, }
3497	TUSCARORA FERTILIZER CO., BALTIMORE, MD. Acid Phosphate,	L. Longanecker, Greensburg,
3090	J. E. TYGERT CO., PHILA., PA., By AM-AG. CHEM. CO. Acid Phosphate,	Geo. S. Miller, Mifflinville,
3334	VIRGINIA CAROLINA CHEMICAL CO., BALTIMORE, MD., for resale by the BASIN MONUMENTAL CO. V. O. C. Co's. 16% Acid Phosphate,	J. A. Weller, Edinburg, E. F. D.,
2114	ROBERT A. WOOLDRIDGE CO., BALTIMORE, MD. Wooldridge's Florida Acid Phosphate,	Schlegel, Adam & Co., Fleetwood,
2222 3271	YORK CHEMICAL WORKS, YORK, PA. }†Dempwolf's Super Phosphate,{	{ A. P. Lippy, Littlestown, } { Preston Bros., Canton, }

†Composite sample.

PHOSPHATE—Continued.

Moisture in 100 pounds.	Phosphoric acid in 100 Pounds.					Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of selection.
	Available.		Insoluble.	Total			
	Found.	Guaranteed.		Found.	Guaranteed.		
9.33	16.11	16.00	.26	*16.36	17.00	12.89	12.75
2.72	14.68	14.00	1.25	16.13	.....	12.84	{ 12.00 14.00 15.00
9.22	14.20	14.00	.34	*14.54	15.00	12.08	.....
5.29	16.70	16.00	1.28	17.98	16.50	14.54	{ 14.00 15.00
6.81	15.02	14.00	.15	15.17	14.50	12.14	12.50
3.98	12.90	14.00	.70	*14.00	15.00	12.57	14.00
5.42	17.70	16.00	1.68	19.20	17.00	15.27	16.00
8.81	15.44	14.00	1.07	16.51	15.00	12.05	.....
8.92	16.67	14.00	.67	17.14	14.50	14.34	{ 15.00 12.25

*Constituents falls below guaranty.

GROUND BONE

Furnishing Phosphoric

Sample number.	Manufactures and Brand.	From Whom Sample Was Taken.
2335 2336 2337 2338	AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK. } †Fine Ground Bone, Pure Raw Bone,	{ H. F. Gump & Son, Everett, O. E. Farr, North East, L. T. Harris, 215 N. 2nd St., Harrisburg, B. F. Horting, Newport,
	ARMOUR'S FERTILIZER WORKS, INC., CHICAGO, ILL. } †Bone Meal,	{ H. C. Berrits Sons, Somerset, S. S. Bryan, Titusville, Geo. C. & F. A. Brooks, Wallaboro,
2354	BALTIMORE PULVERIZING CO., BALTIMORE, MD. Raw Bone,	J. G. Washburne, Millville,
2187	BERG COMPANY, PHILADELPHIA, PA. Berg's Raw Bone Fine,	Edw. F. Bracken, Paoli,
2739 2348 2161 2326	BAUGH & SONS CO., PHILADELPHIA, PA. Baugh's Pure Steamed Bone, } †Baugh's Raw Bone Meal warranted pure...	{ Jas. G. Kaufman, Danburyville, John F. Stier, Johnscoville, Henry Palmer, Langhorne, A. W. Schoener, Womelsdorf,
	BOWKER FERTILIZER CO., NEW YORK. } †Bowker's Fresh Ground Bone,	{ Youngwood Lumber & Supply Co., Youngwood, Jacob Yoder, Hagins,
2684	EUREKA CHEMICAL CO., BALTIMORE, MD. Eureka Ground Bone,	G. C. Davis, Greensburg,
2712 2674 2649 2647 2644	GRIFFITH & BOYD CO., BALTIMORE, MD. } †Pure Fine Ground Bone Meal, } †Griffith & Boyd Co.'s Soft Ground Bone Meal.	{ D. W. & H. W. Grove, Catawissa, Mifflins Bros., Mandanville, Willis O. Herr, Strasburg, Willis O. Herr, Strasburg, J. C. Leib & Co., Stewartstown,
	S. M. HESS & BRO., PHILADELPHIA, PA. High Grade Ground Bone,	Austin Hemminger, Holcogga, R. No. 1,
	THE HUBBARD FERTILIZER CO., BALTIMORE, MD. Hubbard's Pure Bone Meal,	J. L. McLain & Co., Tyrone,
	INTERNATIONAL AGRICULTURAL CORPORATION, BUFFALO, FERTILIZER WORKS, BUFFALO, N. Y. Buffalo Bone Meal,	H. B. Edwards, Titusville,
2461 2361 2364	MARTIN FERTILIZER CO., PHILADELPHIA, PA. Pure Ground Bone, } †Martin's Pure Raw Bone Meal,	{ W. S. Kerstetter, Secy., Sunbury, R. No. 2, Fassmore & Co., Nottingham, Diehl, Onwake & Diehl, Chambersburg,
	MILLER FERTILIZER CO., BALTIMORE, MD. †Ground Bone,	M. T. Harkins, Hickory Hill,
2682	PUGH & LYONS, OXFORD, PA. Pugh & Lyons Ground Raw Bone,	O. E. Kirk & Co., Oxford,

†Composite sample.

FERTILIZERS.

Acid and Nitrogen.

Moisture in 100 pounds.	Mechanical Analysis.		Chemical Analysis.				Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of delivery.
	Diameter less than 1-32 inch. "Fine."	Diameter greater than 1-32 inch. "Coarse."	Phosphoric Acid.		Nitrogen.			
			Found.	Guaranteed.	Found.	Guaranteed.		
2.01	55	45	24.64	22.22	2.67	2.47	21.42	{ 22.00 22.00 24.50
6.25	46	54	21.67	21.51	2.25	2.70	22.67	
.....	51	49	20.50	22.00	2.65	2.47	22.57	{ 22.00 22.00 22.00
2.28	49	51	24.22	22.00	2.54	2.46	20.42	20.00
6.21	47	53	23.42	22.00	2.22	2.60	22.91	24.00
3.00	50	50	22.06	25.00	1.72	1.65	20.84	{ 25.00 25.00 25.00
6.74	55	45	21.46	21.50	4.08	2.70	24.75	
.....	51	49	24.07	22.22	2.72	2.47	21.15	{ 40.00
4.92	50	50	15.02	14.00	2.72	2.47	25.27	22.00
.....	49	51	*19.22	22.00	2.72	2.20	21.24	{ 22.00 24.00 24.00
.....	70	30	12.24	11.00	2.42	2.50	22.22	{ 22.00 22.00 22.00
6.55	47	53	22.42	20.61	2.94	2.22	24.25	20.00
3.21	75	25	24.56	20.50	*2.42	2.00	26.27	40.00
4.42	67	33	24.12	22.00	2.26	2.50	20.00	40.00
3.22	62	38	24.02	22.22	2.54	1.65	21.64	{ 20.00 25.00 25.00
.....	26	74	24.12	21.00	2.61	2.70	22.27	
4.24	60	40	15.75	12.74	2.50	2.47	25.62	24.00
6.52	14	86	22.20	20.00	4.00	2.20	22.72	24.50

*Constituent falls below guaranty.

GROUND BONE

Sample number.	Manufacturer and Brand.		From Whom Sample Was Taken.	
	F. S. ROYSTER GUANO CO., BALTIMORE, MD.			
2122	Royster's Fine Ground Bone Meal,		Harvey Spencer, Cochranville,	
2422	} Royster's Pure Raw Bone Meal,		{ Wm. Biller, Patton,	
2253			{ Blough & Yoder, Holsopple,	
2294			{ Richer & Graft, Scottsdale,	
	SCHAAL SHELTON FERTILIZER CO., BUF- FALO, N. Y.			
2063	High Grade Ground Bone,		Brooklyn Milling Co., Spartansburg,	
	SWIFT & COMPANY, CHICAGO, ILL.			
2590	Swift's Pure Ground Beef Bone,		W. P. House & Son, North East,	
	F. W. TUNNELL & CO., PHILADELPHIA, PA.			
2153	Pure Ground Bone,		Edw. Brinton & Sons, West Chester,	

†Composite sample.

FERTILIZERS—Continued.

Moisture in 100 pounds.	Mechanical Analysis.		Chemical Analysis.				Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of delivery.
	Diameter less than 1-32 inch. "Fine."	Diameter greater than 1-32 inch. "Coarse."	Phosphoric Acid.		Nitrogen.			
			Found.	Guaranteed.	Found.	Guaranteed.		
.....	57	48	24.97	23.00	2.79	2.47	21.77	{ 22.00 22.75 24.80
6.59	42	53	23.99	21.50	2.90	2.70	25.24	
4.94	59	41	21.05	20.50	3.20	3.29	21.63	26.00
3.41	73	27	*25.51	27.00	2.28	2.05	22.06	30.75
3.68	61	39	22.76	22.00	2.92	2.46	22.22	26.00

*Constituent falls below guaranty.

MISCELLANEOUS

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
2282	ALPHANO HUMUS CO., WHITEHALL BLDG., NEW YORK. Alphano Humus,	Willis C. Herr, Strasburg, .....	.....
2728	AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK. Ground Tankage (B-20),	L. F. Harris, 2115 N. 2nd St., Harrisburg,	7.32
2285	High Grade Dried Blood,	J. A. Duck, Middleburg,	6.96
2284	} †Nitrate of Soda,	N. E. Yost, Myerstown, .....	.60
2240		A. A. Schwalim, Secy., Higgins,	
2289	Wm. J. Johnston, Shilling Spring, ..		
2286	ARMOUR'S FERTILIZER WORKS, BALTIMORE, MD. Ground Tankage,	Grove State Co., West Milton,	7.43
2305	Nitrate of Soda,	Orwell Grange, Orwell,	1.47
2598	ASSOCIATED CHEMICAL CO., HAGERS-TOWN, MD. Nitrate of Soda,	Jno. N. Bathgate, State College, ..	.90
2195	BAUGH & SONS CO., PHILADELPHIA, PA.	Geo. W. Holtsinger, Red Lion, ....	.87
2142	} †Nitrate of Soda,	Jas. G. Kaufman, Dauberville,	
2412		Hautch & Swartle, Clearfield,	
2430	BOWKER FERTILIZER CO., BOSTON, MASS.	Alrain Hostetter, Johnstown R. S.,	1.00
3444	} †Nitrate of Soda,	Murray & Co., Homestead,	
2423	CONSUMERS CHEMICAL CORPORATION, NEW YORK. Nitrate of Soda,	Chas. Yaeckle, Patton, .....	.97
2049	FARMERS' FERTILIZER CO. OF AMERICA, PITTSBURGH, PA. Available Phosphate Powder,	J. H. Lavery, Franklin, .....	.44
3274	FEDERAL CHEMICAL CO., COLUMBIA, TENN. Daybreak Tennessee Brown Phosphate Rock,	J. W. King, York Springs, .....	.86
2962	GERMAN KALI WORKS, INC., NEW YORK. Muriate of Potash,	H. E. Vanormer, Thompsonstown, ..	.72
2025	LEBANON FERTILIZER WORKS, LEBANON, PA. Nitrate of Soda,	Horace Kintale, Pine Grove, .....	.51
2960	NITRATE AGENCIES CO., NEW YORK. Dried Blood,	H. E. Vanormer, Thompsonstown, ..	12.62
2954	} †Nitrate of Soda,	The Law Co., Farmers Asso., Inc.,	
2963		Manheim, R. D. No. 1, .....	.76
3069	PATAPSCO GUANO CO., BALTIMORE, MD.	H. E. Vanormer, Thompsonstown, ..	
3427	} †Nitrate of Soda,	John Reese, Dallas,	1.32
		Summit Lumber Co., Clarke Summit,	
3190	RESIN MONUMENTAL CO., BALTIMORE, MD. 9% Tankage,	Em. Boyer, Elizabethtville,	5.94
2914	} †Nitrate of Soda,	Seigfried & Schwoyer, Kempton, ..	1.08
3191		Em. Boyer, Elizabethtville,	
2671	High Grade Ground Fish,	E. H. Keen & Co., Parkersburg, ..	7.53

†Composite sample.

FERTILIZERS.

Phosphoric Acid in 100 Lbs.					Potash in 100 Lbs.				Nitrogen in 100 Lbs.					Computed commercial value of 1,000 pounds at Department rating.	Selling price of 1,000 pounds at point of selection.
Available.		Insoluble.	Total.		Present as murble.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive—Insoluble.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
.....	1.31	.50	.....	.....	.....	.50	.10	.07	4 .99	1.00	1.35	.....	25.00
.....	10.55	9.15	.....	.....	.....	.....	1.45	6.97	64.37	7.94	7.41	44.00	.....
.....	1.45	7.23	22.00	9.33	9.37	43.94	.....
.....	15.44	15.00	49.05	{ 50.00
.....	12.53	6.97	.....	.....	.....	.....	1.72	5.94	22.05	7.99	7.40	46.02	.....
.....	15.62	14.51	50.10	45.00
.....	15.34	15.00	49.75	.....
.....	15.34	15.23	49.05	{ 49.00
.....	15.34	15.23	49.05	{ 51.00
.....	15.70	15.00	50.10	{ 55.00
.....	15.54	14.33	49.05	50.00
*2.62	4.00	.....	5.34	5.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.05
.....	22.97	29.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.00
.....	52.19	.....	52.19	43.00	.....	.....	.....	.....	.....	51.74	.....
.....	15.70	15.07	50.10	45.00
.....	4.21	19.59	22.55	12.14	12.16	63.16	.....
.....	16.22	15.00	51.00	{ 43.00
.....	15.77	15.00	50.35	{ 49.00
.....	{ 50.00
.....	9.34	.....	.....	.....	.....	.....	2.37	5.61	21.51	*7.12	7.41	39.94	35.00
.....	15.34	14.53	49.05	{ 52.00
.....	{ 45.00
.....	7.43	.....	.....	.....	.....	.....	1.20	6.87	22.29	9.16	8.23	46.75	49.00

*Constituents fall below guaranty.

‡ & § Characters indicating the proportion of insoluble nitrogen that is inactive. ‡—2.5 or less; §—2.5 to 3.5; ¶—3.5 or more.

MISCELLANEOUS FERTI

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
2515	SWIFT & CO., BALTIMORE, MD. Tankage,	Chas. McDowell, Mansfield,	6.10
2010	I. P. THOMAS & SONS CO., PHILADEL- PHIA, PA. Nitrate of Soda,	Oscar Ramer, Pitman, R. No. 2, ..	.52
2230	YORK CHEMICAL WORKS, YORK, PA. Dempwolfs High Grade Tankage,	Farmers Cooperative Assn., Dover,	4.61

†Composite sample.

LIZERS—Continued.

Phosphoric Acid in 100 Lbs.				Potash in 100 Lbs.				Nitrogen in 100 Lbs.				Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of selection.	
Available.		Insoluble.	Total.	Present as muriate.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive—Insoluble.	Total.			
Found.	Guaranteed.		Found.			Guaranteed.	Found.				Guaranteed.			Found.	Guaranteed.
.....	10.59	.....	.....	.....	.....	1.82	4.26	11.54	*5.79	8.10	35.77	37.00
.....	15.46	15.00	49.35	51.00
.....	*9.66	10.00	.....	.....	.....	3.22	5.07	11.35	*6.42	7.53	37.42	34.36

*Constituents falls below guaranty.

‡ § § Characters indicating the proportion of insoluble nitrogen that is inactive: ‡—two-fifths or less; §—two-fifths to three-fifths; §—three-fifths or more.



CALENDAR, 1915.

JANUARY.

S	M	T	W	T	F	S
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

FEBRUARY.

S	M	T	W	T	F	S
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	..	..	..	..	..	..

MARCH.

S	M	T	W	T	F	S
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..

APRIL.

S	M	T	W	T	F	S
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	..

MAY.

S	M	T	W	T	F	S
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..

JUNE.

S	M	T	W	T	F	S
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	..	..	..

JULY.

S	M	T	W	T	F	S
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

AUGUST.

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..

SEPTEMBER.

S	M	T	W	T	F	S
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	..	..

OCTOBER.

S	M	T	W	T	F	S
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

NOVEMBER.

S	M	T	W	T	F	S
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	..	..	..	..

DECEMBER.

S	M	T	W	T	F	S
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..

Commonwealth of Pennsylvania

BULLETIN No. 270

FARMERS' INSTITUTES

IN PENNSYLVANIA

TO BE HELD UNDER THE
AUSPICES OF

The Pennsylvania Department of Agriculture

COMPILED BY

A. L. MARTIN, Director of Institutes



SEASON 1915-1916.

HARRISBURG, PA.:
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1915



FARMERS' INSTITUTES IN PENNSYLVANIA

To be held under the auspices of the Department of Agriculture
of the State of Pennsylvania during
Season of 1915-16.



ACT OF THE LEGISLATURE OF MARCH 13, 1895.

"Section 5. That it shall be the duty of the Superintendent of Institutes to arrange them in such manner as to time and places of holding the same as to secure the greatest economy and efficiency of service, and to this end he shall, in each county where such institutes are to be held, confer and advise with the local member of the State Board of Agriculture, together with representatives duly appointed by each county agricultural, horticultural and other like organizations with reference to the appointment of speakers and other local arrangements."

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LETTER OF TRANSMITTAL

DEPARTMENT OF AGRICULTURE

Harrisburg, Pa., Aug. 23, 1915.

Hon. N. B. Critchfield, *Secretary of Agriculture*:

Dear Sir: In accordance with the provisions of the Act creating the Department of Agriculture, I have the honor to present herewith the schedule of Farmers' Institutes of Pennsylvania for the season of 1915-1916; also a complete list of lecturers, with their subjects and their assignments.

Very respectfully,

A. L. MARTIN,
Director of Institutes.



COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF AGRICULTURE

DIVISION OF INSTITUTES

Harrisburg, Pa., *Aug. 23, 1915.*

**To the County Chairmen and Boards of Institute Managers in the
Several Counties of Pennsylvania:**

Gentlemen: In presenting this annual Bulletin, we desire to express approval of the work accomplished by most of our County Institute Managers and the committees organized by them, to whom much credit is due for the high degree of success attending the last season's Institutes. We respectfully invite your careful attention to "Directions" on the following pages, which are prepared with reference to the requirements and demands of persons filling the position of County Chairman of Institutes.

IMPORTANT

INSTITUTE MANAGERS AND PROGRAM COMMITTEES WILL PLEASE READ THE FOLLOWING DIRECTIONS BEFORE ARRANGING PROGRAMS AND CAREFULLY COMPLY WITH SAME IN CONDUCTING INSTITUTES

1. We recommend that programs for all the Institutes held within a county be printed on connected leaves or sheets. This practice is recommended because of economy in cost of printing, also the wider advertising of the different institutes held within the county.

2. Prepare program at least thirty days before the date of Institute.

3. Arrangements should be made with persons in your locality who are to take part on the program either by essay, address or reading, at least eight weeks previous to the meeting.

4. Have a Question Box, and place it in charge of some competent person who will carefully conduct the same.

5. Exclude from Institutes all sectarian and partisan topics.

6. Print on program the name and postoffice address of Chairman and members of Committees.

7. Thoroughly advertise the Institute by distributing programs, invitation postal cards, posters, and make use of your local newspapers.

8. Select a competent secretary to take notes and report proceedings of meeting to local papers.

9. Invite representatives of newspapers to a place at Recording Secretary's table, and solicit their aid and assistance in reporting proceedings of meeting.

10. For a two-day Institute, provide for five sessions, taking up not more than two topics at any one session, and where local speakers have places on program, the committee should be careful and see to it that their subjects shall conform to the topics under consideration at that particular session.

11. Locate Institutes where a suitable hall or church can be procured and the greatest number accommodated, as these meetings are for the benefit of farmers and their families and all others who may be interested.

12. Extend a personal invitation to your County Superintendent of Public Schools to be present and take part, especially at the educational session, without which no Institute is complete. Invite all farm organizations, school teachers and children. See to it that young men and boys have a special invitation to the Institute.

13. At least three State speakers will be in attendance, and a list of topics which they are prepared to discuss can be found in another part of this Bulletin. From this list the Committee on Program should select such topics as would most interest the farmers in their section, and place same opposite the lecturer's name on program.

14. The County Chairman should, as soon as arrangements are completed for holding Institute, enclose to all lecturers expected to be present, a copy of program, with letter designating what railroad station to stop at, and the name of the hotel secured for their accommodation. In case Institute is held at a distance from railroad, speakers must be met by conveyances and taken to Institute. The expense of getting from and to such stations is paid from funds placed in hands of County Chairman.

15. Remember, the Institute is for the whole county and not merely for the town or locality where held. Begin advertising and do not fail to let the public know of your meeting.

16. The State is divided into five sections. Beginning November 15, five Institutes will be in session at the same time. Three State speakers will be present at all Institutes, one of whom will be a special representative of the Department and have charge of the section, to whom shall be referred all questions relating to local management of Institutes. His decision in such matters shall be final.

17. It is important that the Chairman of County Board of Institute Managers make a complete report and mail same to the Director as soon as possible after the close of the Institutes. Blanks for this purpose will be forwarded him.

18. Attention of Institute Managers and Program Committees is especially called to the plan of assigning speakers in the various sections. The leader of the section will be found at head of tabulated list of Places, and Additional Lecturers will be found at right of places where Institutes will be held. Do not make the mistake, as some Committees have done, and overlook the leader of the section, but place his name on the program in like manner as other speakers are assigned.

19. The County Chairman should take personal charge of the meeting or select a person who is well qualified to fill the position.

20. The opening exercises should be brief, not consuming more than thirty minutes, and may consist of an address of welcome and response, or a brief address by the Chairman introducing the speakers who come from a distance.

21. Two topics thoroughly discussed at one session affords the opportunity for more effective instruction than three or four only partially presented.

22. At Educational Session, confine all discussions to that important subject, whether the speakers be State or local.

23. Where two evening sessions are held, have one devoted to Educational subjects and the other to the interests of the Country Home, its Comforts, Sanitary Conditions and Adornments.

24. Music, properly conducted, is in place at the Institute, but should be introduced as a recreation and be voluntary as no fund is set apart for this purpose.

25. The amount of money to be distributed to the various managers for local expenses, will be according to the number of days of Institutes held. In order to make the amount ample for the coming season, the sum has been fixed at \$12.50 per day of Institute. This provides \$25.00 for each two days of Institute, to be used for local expenses, such as printing programs, rent of halls, and hotel and traveling expenses of local managers. County Chairmen are reimbursed for all reasonable expenses up to \$12.50 per day, but no per diem pay is recognized.

DIRECTIONS FOR CONSTITUTING LOCAL COMMITTEES ON INSTITUTE WORK IN THE SEVERAL COUN- TIES OF PENNSLVANIA

The act of March 13, 1895 (Section 5), makes the following provisions: "That it shall be the duty of the Superintendent of Institutes to arrange them in such manner as to time and places of holding the same, as to secure the greatest economy and efficiency of service, and to this end he shall, in each county where such institutes are to be held, confer and advise with the local member of the State Board of Agriculture, together with the representatives duly appointed by each county agricultural, horticultural or other like organizations, with reference to the appointment of speakers and other local arrangements."

In order to carry this provision of the law into effect, the Director of Institutes directs that these representatives, one from each county organization as stated, duly chosen and properly accredited, together with the County Chairman of Institutes, shall constitute a Board of County Institute Managers, of which the County Chairman of Institutes shall be the Chairman of the said Board. The organizations entitled to representation, are members of the State Board of Agriculture, County Agricultural and Horticultural Societies, Pomona Granges and County Alliances.

The duty of this Board shall be to confer and advise with each other and the Director of Institutes, with reference to the appointment of speakers and other local arrangements for holding institutes.

It shall be the duty of each county organization named to notify the Director of Institutes of the appointment of its representatives, and at the same time give a similar notice to the County Chairman of Institutes.

The County Chairman of Institutes, together with these representatives of the county organizations, shall meet for organization on the second Tuesday in June in each year, at one o'clock P. M., in the county town, at the office of the county commissioners. At this meeting the place for holding institutes for the ensuing season shall be selected, the same to be subject to the approval of the Director of Institutes. An institute committee will also be appointed at this time, for each locality in which institutes are to be held.

The County Chairman of Institutes, and each duly accredited representative of the county organizations in attendance upon this meeting shall, upon the certificate of the Chairman of the Board of Managers, be paid his expenses, not to exceed two dollars.

In these meetings every member shall have equal voice, and the action of the majority shall decide. Notice of the action of the Board shall be sent by the Chairman to the Director of Institutes, within ten days after the meeting.

In case no representative from any county organization of that county shall appear at the meeting on the second Tuesday of June, as stated, then the County Chairman of Institutes shall immediately report the fact to the Director of Institutes and proceed to arrange for the holding of institutes that year, without further consultation with the local organizations.

All moneys allotted to any county, for use in institute work, will be paid to the chairman of the local committee, to be accounted for by him in an itemized statement, audited and signed by auditors appointed by the committee, and then forwarded to this Department, not later than the first day of May in each year.

APPORTIONMENT FOR 1915-1916.

Section 1		Section 2		Section 3		Section 4		Section 5		Schools	
County	Days	County	Days	County	Days	County	Days	County	Days	County	Days
Adams,	6	Bedford,	5	Allegheny,	6	Bradford,	8	Bucks,	6	Cambria,	4
Chester,	6	Blair,	5	Armstrong,	6	Cameron,	2	Carbon,	6	Columbia,	6
Cumberland,	6	Cambria,	5	Clarion,	6	Cinton,	4	Delaware,	4	Montour,	4
Dauphin,	6	Centers,	6	Clarke,	6	Clinton,	4	Lehigh,	6	.....	.....
Franklin,	6	Chesapeake,	6	Crawford,	6	Forest,	4	Luzerne,	6	.....	.....
Lebanon,	12	Columbia,	4	Erie,	8	Jefferson,	4	Monroe,	6	.....	.....
Perry,	12	Franklin,	5	Greene,	6	Lycoming,	6	Lackawanna,	6	.....	.....
York,	4	Huntingdon,	5	Lawrence,	4	McKean,	4	Montgomery,	8	.....	.....
.....	.....	Indiana,	8	Mercer,	6	Pike,	5	Northampton,	6	.....	.....
.....	.....	Junata,	4	Washington,	6	Potter,	6	Philadelphia,	2	.....	.....
.....	.....	Northumberland,	5	Westmoreland,	6	Sullivan,	4	Schuylkill,	6	.....	.....
.....	.....	Snyder,	5	Venango,	4	Susquehanna,	6	Wyoming,	4	.....	.....
.....	.....	Somerset,	6	.....	.....	Wayne,	6	.....	.....	.....	.....
.....	.....	Union,	4	.....	.....	Tioga,	8	.....	.....	.....	.....
.....	74	.....	72	.....	78	.....	77	.....	66	.....	14

COMPLETE LIST OF
PENNSYLVANIA FARMERS' INSTITUTES,
SEASON OF 1915-16.

**GIVING THE COUNTIES IN ALPHABETICAL ORDER AND THE NAME AND ADDRESS OF
THE CHAIRMAN OF EACH COUNTY; ALSO POST-OFFICE AND RAILROAD STATION OF
PLACE WHERE INSTITUTES ARE HELD**



DIVISION OF INSTITUTES.

County.	Place.	Post Office.	Railroad Station.	Date.	Chairman of Institutes.
Adams,	Arendtville, Fairfield, New Oxford,	Arendtville, Fairfield, New Oxford,	Biglerville, Fairfield, New Oxford,	Dec. 12-14, Dec. 15-16, Dec. 17-18,	A. I. Weldner, Arendtville.
Allegheny,	Millertown, Ferryville, Mt. Union,	Tarentum R. D., Allison Park R. D., Carnegie R. D. No. 2,	Tarentum, Keown, Thornburg,	Nov. 29-30, Dec. 1-2, Dec. 3-4,	C. L. Hood, Coraopolis, R. D. No. 2.
Armstrong,	Spring Church, Brick Church, Cowanville,	Apollo, Brick Church, Cowanville,	Apollo, Kelly Station, Cowanville,	Jan. 31-Feb. 1, Feb. 3-8, Feb. 4-5,	S. S. Elyholder, Kelly Station.
Beaver,	Hanover U. P. Church, Ohio Grange Hall, Chippewa Grange Hall,	Murdockville R. D., Beaver R. D., Beaver Falls R. D.,	Cooks Ferry, Beaver, Beaver Falls,	Nov. 22-23, Nov. 24-25, Nov. 26-27,	Walter C. Dunlap, West Bridgewater.
Bedford,	Cesena, Loyaburg, Mench,	Cesena, Loyaburg, Everett R. D. No. 3,	Cesena, Hopewell, Everett,	Jan. 12-13, Jan. 14-15, Jan. 17,	W. F. Biddle, Everett, R. D. No. 2.
Berks,	Bally, Mt. Aetna, Temple, Jacksonwald, Geigertown,	Bally, Mt. Aetna, Temple, Jacksonwald, Geigertown,	Boyetown, Womelsdorf, Temple, Jacksonwald, Geigertown,	Feb. 21-22, Feb. 23-24, Feb. 25-26, Feb. 27-28, Feb. 29,	H. G. McGowan, Geigers Mills.
Blair,	Geeseytown, Newry, Bellwood,	Geeseytown, Newry, Bellwood,	Geeseytown, Newry, Bellwood,	Feb. 1-2, Feb. 3-4, Feb. 5,	W. Frank Beck, 1927 W. Chestnut Ave., Altoona, Pa.
Bradford,	Wilmington, Stevensville, Jane Hill, Rome,	Wyalusing R. D., Stevensville, Wyalusing, Jane Hill, Wyalusing, Wysox,	Wyalusing, Stevensville, Wyalusing, Rome,	Dec. 15-16, Dec. 17-18, Dec. 20-21, Dec. 22-23,	F. D. Kerrick, Towanda, R. D.
Bucks,	Springtown, Sellersville, Bristol, New Hope, Newtown,	Springtown, Sellersville, Bristol, New Hope, Newtown,	Springtown, Sellersville, Bristol, New Hope, Newtown,	Jan. 31-Feb. 1, Feb. 2-3, Feb. 4-5, Feb. 6-7, Feb. 7-8,	B. F. Wambold, Sellersville.

DIVISION OF INSTITUTES—Continued.

County.	Place.	Post Office.	Railroad Station.	Date.	Chairman of Institutes.
Butler.	Prospect, Bruin, Evans City.	Prospect, Bruin, Evans City.	Isla, Bruin, Evans City.	Jan. 17-18, Jan. 19-20, Jan. 21-22.	W. H. Milliron, Euclid.
Cambria.	Benshoff Church, (Movable Institute School), Salix.	Johnstown R. D., Salix.	Johnstown, Salix.	Jan. 3-4, Jan. 10-13.	L. J. Bearer, Hastings.
Cameron.	Emporium.	Emporium.	Emporium.	Feb. 21-23.	R. P. Hellman, Emporium.
Carbon.	Big Creek, Mahoning, Weatherly.	Lehighton, Lehighton, Weatherly.	Lehighton, Lehighton, Weatherly.	Nov. 24-25, Nov. 26-27, Nov. 29-30.	Edw. Leinhard, Lehighton, R. D. No. 2.
Center.	Millheim, Pine Grove Mills, Pleasant Gap.	Millheim, Pine Grove Mills, Belleville R. D., Pleasant Gap.	Coburn, Pine Grove Mills, Pleasant Gap.	Dec. 13-14, Dec. 15-16, Dec. 17-18.	John A. Woodward, Howard.
Chester.	Cedarville, Reyers, Parkersburg, Doe Run.	Pottstown, Uwchland, Parkersburg, Doe Run.	Pottstown, Reyers, Parkersburg, Doe Run.	March 1-2, March 3-4, March 6-7, March 8-9.	M. E. Conard, Westgrove.
Clarion.	Clarion, Mula, Progtown, Sligo.	Clarion, Clarion, Progtown, Sligo.	Clarion, Clarion, Limestone, Sligo.	Feb. 7-8, Feb. 9-10, Feb. 11-12.	J. H. Wilson, Clarion.
Clearfield.	Kylertown, Troutville, Hickory.	Kylertown, Troutville, Pendelf.	Winburn, Sykesville, Sabula.	Dec. 20-21, Dec. 22-23, Dec. 24.	Harrison Straw, Clearfield.
Clinton.	Woolrich, Mackeyville, Loganton.	Woolrich, Mackeyville, Loganton.	Lock Haven, Mackeyville, Loganton.	Feb. 23-24, Feb. 25-26, Feb. 28.	Joel A. Kerr, Millball.
Columbia.	Jerseytown (Movable Institute School), Numidia (Movable In- stitute School).	Jerseytown, Numidia.	Jerseytown, Catawissa.	Jan. 4-6, Jan. 6-8.	A. P. Young, Millville, R. D. No. 1.

Crawford,	Cochran,	Cochran,	Cochran,	Cochran,	Feb. 18-19,	W. F. Throop, Marysville.
	Conneaut Lake,	Conneaut Lake,	Conneaut Lake,	Conneaut Lake,	Feb. 21-22,	
	Dicksonburg,	Dicksonburg,	Dicksonburg,	Dicksonburg,	Feb. 23-24,	
	Townville,	Townville,	Townville,	Townville,	Feb. 25-26,	
Cumberland,	Newburg,	Newburg,	Newburg,	Newburg,	Jan. 17-18,	T. J. Ferguson, Mechanicsburg.
	Centerville,	Centerville,	Centerville,	Centerville,	Jan. 19-20,	
	Hogestown,	Hogestown,	Hogestown,	Hogestown,	Jan. 21-22,	
Dauphin,	Gratz,	Gratz,	Gratz,	Gratz,	Jan. 31-Feb. 1,	E. S. Keiper, Middletown.
	Halifax,	Halifax,	Halifax,	Halifax,	Feb. 2-3,	
	Lingiestown,	Lingiestown,	Lingiestown,	Lingiestown,	Feb. 4-5,	
Delaware,	Village Green,	Village Green,	Village Green,	Village Green,	Feb. 18-19,	Thos. H. Wittkorn, Media.
	Williamson School,	Williamson School,	Williamson School,	Williamson School,	Feb. 21-22,	
Elk,	St. Marys,	St. Marys,	St. Marys,	St. Marys,	Feb. 11-12,	John G. Schmidt, St. Marys.
	Weedville,	Weedville,	Weedville,	Weedville,	Feb. 14-15,	
Erie,	West Green Grange Hall,	West Green Grange Hall,	West Green Grange Hall,	West Green Grange Hall,	Feb. 28-29,	Ardie Billings, Edinboro.
	North East,	North East,	North East,	North East,	March 1-2,	
	Girard,	Girard,	Girard,	Girard,	March 3-4,	
Fayette,	Obiopolis,	Obiopolis,	Obiopolis,	Obiopolis,	Nov. 18-20,	John T. Smith, Dunbar.
	Old Frame,	Old Frame,	Old Frame,	Old Frame,	Nov. 22-23,	
	Tippecanoe,	Tippecanoe,	Tippecanoe,	Tippecanoe,	Nov. 24,	
Forest,	Tionesta,	Tionesta,	Tionesta,	Tionesta,	Feb. 7-8,	C. A. Randall, Tionesta.
	Clarington,	Clarington,	Clarington,	Clarington,	Feb. 9-10,	
Franklin,	Dry Run,	Dry Run,	Dry Run,	Dry Run,	Jan. 10-11,	J. P. Young, Marion.
	Fannettsburg,	Fannettsburg,	Fannettsburg,	Fannettsburg,	Jan. 12-13,	
	Marion,	Marion,	Marion,	Marion,	Jan. 14,	
	Scotland,	Scotland,	Scotland,	Scotland,	Jan. 15,	
Fulton,	Rehobeth,	Rehobeth,	Rehobeth,	Rehobeth,	Jan. 18-19,	Frank Ranck, Hancock, Md., R. D.
	Clear Ridge,	Clear Ridge,	Clear Ridge,	Clear Ridge,	Jan. 20,	
	End,	End,	End,	End,	Jan. 21,	
Greene,	Jefferson,	Jefferson,	Jefferson,	Jefferson,	Dec. 12-14,	J. W. Stewart, Jefferson.
	Mt. Pleasant Church,	Mt. Pleasant Church,	Mt. Pleasant Church,	Mt. Pleasant Church,	Dec. 15-16,	
Huntingdon,	Saltito,	Saltito,	Saltito,	Saltito,	Jan. 22,	G. G. Hutchison, Warriors Mark.
	Warriors Mark,	Warriors Mark,	Warriors Mark,	Warriors Mark,	Feb. 7-8,	
	Markelsburg,	Markelsburg,	Markelsburg,	Markelsburg,	Feb. 9-10,	
Indiana,	Elders Ridge,	Elders Ridge,	Elders Ridge,	Elders Ridge,	Nov. 28,	S. C. George, West Lebanon.
	Shelock,	Shelock,	Shelock,	Shelock,	Nov. 27,	
	Flora,	Flora,	Flora,	Flora,	Nov. 28-30,	
	Pine Flats,	Pine Flats,	Pine Flats,	Pine Flats,	Dec. 1-2,	
	Wilgus,	Wilgus,	Wilgus,	Wilgus,	Dec. 3-4,	
Jefferson,	Zion Church,	Zion Church,	Zion Church,	Zion Church,	Feb. 15-17,	Peter B. Cowan, Brookville.
	Beachwoods P. Church,	Beachwoods P. Church,	Beachwoods P. Church,	Beachwoods P. Church,	Feb. 18-19,	

DIVISION OF INSTITUTES—Continued.

County.	Place.	Post Office.	Railroad Station.	Date.	Chairman of Institutes.
Junata,	Richfield, Port Royal,	Richfield, Port Royal,	Midlin, Port Royal,	Feb. 18-17, Feb. 18-19,	Matthew Rodgers, Mexico.
Lackawanna,	Daleville, Tompkinsville,	Daleville, Tompkinsville,	Moscow, Jermyn,	Dec. 1-2, Dec. 3-4,	Horace Seamans, Factoryville.
Lancaster,	Bald Mount,	Clarks Summit, Clarks Summit,	Clarks Summit, Clarks Summit,	Dec. 6-7, Dec. 6-7,	J. W. Bruckart, Littlea.
Lawrence,	Blue Ball, Lampeter,	Blue Ball, Lampeter,	Blue Ball, Lampeter,	Nov. 19-20, Nov. 22-23,	
	Paradise, Mechanicville,	Paradise, Mechanicville,	Paradise, Mechanicville,	Nov. 28-27, Nov. 29-30,	
	Littiz,	Littiz,	Littiz,	Dec. 1-2, Dec. 3-4,	
	Maytown,	Maytown,	Maytown,	Dec. 3-4,	
	Moravia, Plaingrove,	Moravia, Plaingrove,	Moravia, Plaingrove,	Jan. 2-4, Jan. 5-6,	Sylvester Shaffer, New Castle, R. D.
	Pulaski,	Pulaski,	Pulaski,	Jan. 5-6, Jan. 7-8,	No. 4.
Lebanon,	Schaefferstown,	Schaefferstown, Annville,	Richmond, Annville,	Jan. 3-4, Jan. 5-6,	Edward Shuey, Annville, R. D.
	Jonestown,	Jonestown,	Jonestown,	Jan. 7-8,	
Lehigh,	Pleasant Corner,	Jordan,	Germanaville, Allentown,	Jan. 17-18, Jan. 19-20,	P. S. Fenstermacher, Allentown.
	Macungie,	Breinigsville R. D., Macungie,	Macungie, Macungie,	Jan. 21-22, Jan. 21-22,	
Luzerne,	Hobbs, Bloomingdale,	Wapwallopen, R. D., Bloomingdale,	Wapwallopen, Shickshinny,	Dec. 13-14, Dec. 15-16,	J. E. Hildebrandt, Dallas.
	Dallas,	Dallas,	Dallas,	Dec. 17-18,	
Lycoming,	Fredericks Church,	Jersey Shore, Montgomery,	Jersey Shore, Montgomery,	Feb. 29, March 1-2,	B. F. Kahler, Hughesville.
	Hughesville,	Hughesville,	Hughesville,	March 3-4,	
McKean,	Kane,	Kane,	Kane,	Nov. 15-16, Nov. 17-18,	E. A. Studholme, Smethport.
	Cerca,	Cerca,	Olean, N. Y.,	Nov. 17-18,	
Mercer,	Greenville,	Greenville, Mercer,	Greenville, Mercer,	Jan. 10-11, Jan. 12-13,	Wm. C. Black, Mercer.
	London,	Grove City, Grove City,	Grove City, Grove City,	Jan. 14-15, Jan. 14-15,	
Midlin,	McVeytown,	McVeytown, Milroy,	McVeytown, Milroy,	Feb. 11-12, Feb. 14-15,	C. M. Smith, Lewisistown.

Monroe,	Stronaburg,	Stronaburg,	Nov. 12-19,	F. S. Brong, Saylorsburg.
Monroe,	Tannersville,	Tannersville,	Nov. 20,	
Monroe,	Gilbert,	Kunkietown,	Nov. 22-23,	
Montgomery,	Plymouth Meeting,	Norristown,	Feb. 9,	J. H. Schultz, Norristown.
Montgomery,	Worcester,	Norristown,	Feb. 10-11,	
Montgomery,	Harleysville,	Salford,	Feb. 12,	
Montgomery,	Trappe,	Collegeville,	Feb. 14-15,	
Montgomery,	East Greenville,	East Greenville,	Feb. 16-17,	
Montour,	(Movable Institute School), Maunsdale,	Maunsdale,	Jan. 7-11,	J. Miles Derr, Milton, R. D. No. 1.
Northampton,	Nazareth,	Nazareth,	Jan. 10-11,	C. S. Messinger, Tatamy.
Northampton,	Mount Bethel,	Portland,	Jan. 12-13,	
Northampton,	Cherryville,	Treichlers,	Jan. 14-15,	
Northumberland,	Rebeck,	Herndon,	March 1-2,	I. A. Eschbach, Milton, R. D. No. 1.
Northumberland,	McEwenaville,	McEwenaville,	March 3-4,	
Northumberland,	Elysburg,	Parinos,	March 6,	
Philadelphia,	Philadelphia,	Philadelphia,	Feb. 23-24,	David Rust, Horticultural Hall, Phila.
Perry,	Ickesburg,	Greenpark,	Dec. 20-21,	C. M. Bower, Blain.
Perry,	Greenpark,	Greenpark,	Dec. 22-23,	
Pike,	Greentown,	Gouldsboro,	Jan. 17-18,	B. F. Killam, Paupack.
Pike,	Paupack,	Lawrence,	Jan. 19-20,	
Pike,	Egypt Mills,	Bushkill,	Jan. 21-22,	
Potter,	Oswayo,	Oswayo,	Nov. 19-20,	A. T. Crittenden, Oswayo.
Potter,	Genesee,	Genesee,	Nov. 22-23,	
Potter,	Ulysses,	Ulysses,	Nov. 24,	
Schuylkill,	Summit,	Hammond,	Jan. 3-4,	John Shoener, Orwigsburg, R. D. No. 1.
Schuylkill,	Klingerstown,	Herndon,	Jan. 5,	
Schuylkill,	Pitman,	Locustdale,	Jan. 6,	
Schuylkill,	Andreas,	Andreas,	Jan. 7-8,	
Snyder,	Middleburg,	Middleburg,	Feb. 21-22,	F. F. Glass, Freeburg.
Snyder,	Mt. Pleasant Mills,	Middleburg,	Feb. 23-24,	
Somerset,	Roswell,	Roswell,	Jan. 5,	Robt. W. Lohr, Boswell.
Somerset,	Storcktown,	Storcktown,	Jan. 6,	
Somerset,	Somerset,	Somerset,	Jan. 7-8,	
Somerset,	Berlin,	Berlin,	Jan. 10-11,	
Sullivan,	Muncy Valley,	Muncy Valley,	Dec. 10-11,	G. Eugene Bown, Forksville.
Sullivan,	Colley,	Dunmore,	Dec. 13-14,	
Susquehanna,	Dimock,	Dimock,	Jan. 4,	E. M. Tower, Hallstead.
Susquehanna,	Harford,	Kingsley,	Jan. 4-5,	
Susquehanna,	Clifford,	Carbondale,	Jan. 6,	
Susquehanna,	Thompson,	Thompson,	Jan. 7-8,	

DIVISION OF INSTITUTES—Continued.

County.	Place.	Post Office.	Railroad Station.	Date.	Chairman of Institutes.
Toga.	Westfield, Wellboro, Jobs Corner, Mansfield, Liberty.	Westfield, Wellboro, Jackson Summit, Mansfield, Liberty.	Westfield, Wellboro, Jackson Summit, Mansfield, Blossburg.	Nov. 26-27, Nov. 28-30, Dec. 1, Dec. 2-3, Dec. 4.	C. H. DeWitt, Mansfield.
Union.	Hartleton, White Deer Church.	Hartleton, Lewisburg.	Millmont, West Milton.	Feb. 25-26, Feb. 28-29.	J. Newtown Glover, Vicksburg.
Venango.	Rockland, Dempseytown.	Franklin, Franklin.	Franklin, Franklin.	Feb. 14-15, Feb. 16-17.	W. A. Crawford, Cooperstown.
Warren.	Sugargrove, Youngsville, Warren.	Sugargrove, Youngsville, Warren.	Youngsville, Youngsville, Warren.	Feb. 1-2, Feb. 3, Feb. 4-5.	R. J. Weld, Sugargrove.
Washington.	Scenery Hill, Ginger Hill, Old Concord.	Scenery Hill, Monongahela, Dunns Station.	Washington, Monongahela, Waynesburg.	Nov. 15-16, Nov. 17-18, Nov. 19-20.	Jas. M. Paxton, Houston.
Wayne.	Orson, Pleasant Mt., Aldenville, Honesdale, Honesdale.	Orson, Pleasant Mt., Aldenville, Honesdale, Honesdale.	Orson, Pleasant Mt., Honesdale, Honesdale.	Jan. 10, Jan. 11-12, Jan. 13-14, Jan. 14-15.	W. B. Perham, Varden.
Westmoreland.	Scottdale, Irwin, Greensburg, Latrobe.	Scottdale, Irwin, Greensburg, Latrobe.	Scottdale, Irwin, Greensburg, Latrobe.	Dec. 17-18, Dec. 20, Dec. 21-22, Dec. 23.	W. F. Holtzer, Greensburg.
Wyoming.	Tunkhannock, East Lemon.	Tunkhannock, East Lemon.	Tunkhannock, Tunkhannock.	Dec. 24-25, Dec. 27-28.	G. A. Benson, Tunkhannock.
York.	Cross Roads, Stewartstown, New Freedom, Dover, Loganville, Red Lion.	Felton R. D., Stewartstown, New Freedom, Dover, Loganville, Red Lion.	Felton, Stewartstown, New Freedom, York, York, Red Lion.	Feb. 7-8, Feb. 9-10, Feb. 11-12, Feb. 14-15, Feb. 16-17, Feb. 18-19.	G. F. Barnes, Rossville.

PENNSYLVANIA FARMERS' INSTITUTES

ASSIGNMENTS OF LECTURERS BY SECTIONS FOR 1915-16.

FIRST SECTION

SHELDON W. FUNK will attend all meetings in this section.

Date.	Place.	County.	Additional Lecturers.
Nov.	19-20, Blue Ball,	Lancaster,	Prof. F. S. Putney and C. M. Barnitz.
Nov.	22-23, Lampeter,	Lancaster,	Prof. F. S. Putney and C. M. Barnitz.
Nov.	26-27, Paradise,	Lancaster,	Prof. F. S. Putney and C. M. Barnitz.
Nov.	29-30, Mechanicsville,	Lancaster,	Prof. Wells W. Cooke, C. M. Barnitz and C. E. Myers.
Dec.	1-2, Lititz,	Lancaster,	Prof. Wells W. Cooke, C. M. Barnitz and C. E. Myers.
Dec.	3-4, Maytown,	Lancaster,	Prof. Wells W. Cooke, C. M. Barnitz and C. E. Myers.
Dec.	13-14, Arendtsville,	Adams,	E. L. Phillips and Paul I. Wrigley.
Dec.	15-16, Fairfield,	Adams,	E. L. Phillips and Paul I. Wrigley.
Dec.	17-18, New Oxford,	Adams,	E. L. Phillips and Paul I. Wrigley.
Dec.	20-21, Ickesburg,	Perry,	E. L. Phillips and Paul I. Wrigley.
Dec.	22-23, Greenpark,	Perry,	E. L. Phillips and Paul I. Wrigley.
Jan.	3-4, Schaefferstown,	Lebanon,	Raymond S. Smith and H. M. Anderson.
Jan.	5-6, Annville,	Lebanon,	Raymond S. Smith and H. M. Anderson.
Jan.	7-8, Jonestown,	Lebanon,	Raymond S. Smith and H. M. Anderson.
Jan.	10-11, Dry Run,	Franklin,	E. L. Phillips and H. M. Anderson.
Jan.	12-13, Fannettsburg,	Franklin,	E. L. Phillips and H. M. Anderson.
Jan.	14, Marion,	Franklin,	E. L. Phillips and H. M. Anderson.
Jan.	15, Scotland,	Franklin,	E. L. Phillips and H. M. Anderson.
Jan.	17-18, Newburg,	Cumberland,	E. L. Phillips and Prof. Franklin Menges.
Jan.	19-20, Centerville,	Cumberland,	E. L. Phillips and Prof. Franklin Menges.
Jan.	21-22, Hogestown,	Cumberland,	E. L. Phillips and Prof. Franklin Menges.
Jan. 31-Feb. 1,	Gratz,	Dauphin,	E. L. Phillips and S. C. George.
Feb.	2-3, Halifax,	Dauphin,	E. L. Phillips and S. C. George.
Feb.	4-5, Linglestown,	Dauphin,	E. L. Phillips and S. C. George.
Feb.	7-8, Cross Roads,	York,	E. L. Phillips and R. J. Weld.

Date.	Place.	County.	Additional Lecturers.
Feb.	9-10, Stewartstown,	York,	E. L. Phillips and R. J. Weld.
Feb.	11-12, New Freedom,	York,	E. L. Phillips and R. J. Weld.
Feb.	14-15, Dover,	York,	E. L. Phillips and Chas. F. Noll.
Feb.	16-17, Loganville,	York,	E. L. Phillips and Chas. F. Noll.
Feb.	18-19, Red Lion,	York,	E. L. Phillips and Chas. F. Noll.
Feb.	21-22, Bally,	Berks,	E. L. Phillips and L. W. Lighty.
Feb.	23-24, Mt. Aetna,	Berks,	E. L. Phillips and L. W. Lighty.
Feb.	25-26, Temple,	Berks,	E. L. Phillips and L. W. Lighty.
Feb.	28, Jacksonwald,	Berks,	E. L. Phillips and L. W. Lighty.
Feb.	29, Geigertown,	Berks,	E. L. Phillips and L. W. Lighty.
March	1-2, Cedarville,	Chester,	E. L. Phillips and L. W. Lighty.
March	3-4, Beyers,	Chester,	E. L. Phillips and L. W. Lighty.
March	6-7, Parkesburg,	Chester,	E. L. Phillips and L. W. Lighty.
March	8-9, Doe Run,	Chester,	E. L. Phillips and L. W. Lighty.

SECOND SECTION

D. H. WATTS will attend all meetings in this section.

Date.	Place.	County.	Additional Lecturers.
Nov.	19-20, Ohioptyle,	Fayette,	C. R. Orton and J. Stuart Groupe.
Nov.	22-23, Old Frame,	Fayette,	C. R. Orton and J. Stuart Groupe.
Nov.	24, Tippecanoe,	Fayette,	C. R. Orton and J. Stuart Groupe.
Nov.	26, Elders Ridge,	Indiana,	C. C. McCurdy and J. Stuart Groupe.
Nov.	27, Shelocta,	Indiana,	C. C. McCurdy and J. Stuart Groupe.
Nov.	29-30, Flora,	Indiana,	C. C. McCurdy and J. Stuart Groupe.
Dec.	1-2, Pine Flats,	Indiana,	C. C. McCurdy and J. Stuart Groupe.
Dec.	3-4, Wilgus,	Indiana,	C. C. McCurdy and J. Stuart Groupe.
Dec.	13-14, Millheim,	Center,	M. H. McCallum, W. Theo. Wittman and S. I. Bechdel.
Dec.	15-16, Pine Grove Mills,	Center,	M. H. McCallum, W. Theo. Wittman and S. I. Bechdel.
Dec.	17-18, Pleasant Gap,	Center,	M. H. McCallum and W. Theo. Wittman.
Dec.	20-21, Kylertown,	Clearfield,	M. H. McCallum and W. Theo. Wittman.
Dec.	22-23, Troutville,	Clearfield,	M. H. McCallum and W. Theo. Wittman.
Dec.	24, Hickory,	Clearfield,	M. H. McCallum and W. Theo. Wittman.
Jan.	3-4, Benshoff Church,	Cambria,	M. H. McCallum and R. O. Umholtz.
Jan.	5, Boswell,	Somerset,	M. H. McCallum and R. O. Umholtz.
Jan.	6, Stoyestown,	Somerset,	M. H. McCallum and R. O. Umholtz.

Date.	Place.	County.	Additional Lecturers.
Jan.	7-8, Somerset,	Somerset,	M. H. McCallum and R. O. Umholtz.
Jan.	10-11, Berlin,	Somerset,	M. H. McCallum and R. O. Umholtz.
Jan.	12-13, Cessna,	Bedford,	M. H. McCallum and R. O. Umholtz.
Jan.	14-15, Loysburg,	Bedford,	M. H. McCallum and W. Theo. Wittman.
Jan.	17, Mench,	Bedford,	M. H. McCallum and W. Theo. Wittman.
Jan.	18-19, Rehobeth,	Fulton,	M. H. McCallum and W. Theo. Wittman.
Jan.	20, Clear Ridge,	Fulton,	M. H. McCallum and W. Theo. Wittman.
Jan.	21, Enid,	Fulton,	M. H. McCallum and W. Theo. Wittman.
Jan.	22, Saltillo,	Huntingdon,	M. H. McCallum and W. Theo. Wittman.
Feb.	1-2, Geeseytown,	Blair,	M. H. McCallum and W. Theo. Wittman.
Feb.	3-4, Newry,	Blair,	M. H. McCallum and W. Theo. Wittman.
Feb.	5, Bellwood,	Blair,	M. H. McCallum and W. Theo. Wittman.
Feb.	7-8, Warriors Mark,	Huntingdon,	M. H. McCallum and W. Theo. Wittman.
Feb.	9-10, Marklesburg,	Huntingdon,	M. H. McCallum and W. Theo. Wittman.
Feb.	11-12, McVeytown,	Mifflin,	M. H. McCallum and W. Theo. Wittman.
Feb.	14-15, Milroy,	Mifflin,	M. H. McCallum and W. Theo. Wittman.
Feb.	16-17, Richfield,	Juniata,	M. H. McCallum and W. Theo. Wittman.
Feb.	18-19, Port Royal,	Juniata,	M. H. McCallum and W. Theo. Wittman.
Feb.	21-22, Middleburg,	Snyder,	John W. White and W. Theo. Wittman.
Feb.	23-24, Mt. Pleasant Mills, ..	Snyder,	John W. White and W. Theo. Wittman.
Feb.	25-26, Hartleton,	Union,	John W. White and W. Theo. Wittman.
Feb.	28-29, White Deer Church, ..	Union,	Vern T. Struble and W. Theo. Wittman.
March	1-2, Rebuck,	Northumberland, ..	Vern T. Struble and W. Theo. Wittman.
March	3-4, McEwensville,	Northumberland, ..	Vern T. Struble and W. Theo. Wittman.
March	6, Elysburg,	Northumberland, ..	Vern T. Struble and W. Theo. Wittman.

THIRD SECTION

E. B. DORSETT will attend all meetings in this section.

Date.	Place.	County.	Additional Lecturers.
Nov.	15-16, Scenery Hill,	Washington,	F. H. Fassett and J. A. Herman.
Nov.	17-18, Ginger Hill,	Washington,	F. H. Fassett and J. A. Herman.
Nov.	19-20, Old Concord,	Washington,	F. H. Fassett and J. A. Herman.
Nov.	22-23, Hanover U.P. Church, ..	Beaver,	F. H. Fassett and J. A. Herman.
Nov.	24-25, Ohio Grange Hall, ..	Beaver,	F. H. Fassett and J. A. Herman.
Nov.	26-27, Chippewa Hall,	Grange Beaver,	F. H. Fassett and J. A. Herman.
Nov.	29-30, Millerstown,	Allegheny,	F. H. Fassett and J. A. Herman.

Date.	Place.	County.	Additional Lecturers.
Dec.	1-2, Perrysville,	Allegheny,	F. H. Fassett and J. A. Herman.
Dec.	3-4, Mt. Union,	Allegheny,	F. H. Fassett and J. A. Herman.
Dec.	13-14, Jefferson,	Greene,	Robt. S. Seeds and E. L. Worthen.
Dec.	15-16, Mt. Pleasant Church,	Greene,	Robt. S. Seeds and E. L. Worthen.
Dec.	17-18, Scottdale,	Westmoreland,	Robt. S. Seeds and E. L. Worthen.
Dec.	20, Irwin,	Westmoreland,	Robt. S. Seeds and T. J. Philips.
Dec.	21-22, Greensburg,	Westmoreland,	Robt. S. Seeds and T. J. Philips.
Dec.	23, Latrobe,	Westmoreland,	Robt. S. Seeds and T. J. Philips.
Jan.	3-4, Moravia,	Lawrence,	Robt. S. Seeds and C. M. Barnitz.
Jan.	5-6, Plaingrove,	Lawrence,	Robt. S. Seeds and C. M. Barnitz.
Jan.	7-8, Pulaski,	Lawrence,	Robt. S. Seeds and C. M. Barnitz.
Jan.	10-11, Greenville,	Mercer,	Geo. S. Bulkley and C. M. Barnitz.
Jan.	12, Mercer,	Mercer,	Geo. S. Bulkley and C. M. Barnitz.
Jan.	13, Mercer,	Mercer,	Prof. W. H. Tomhave and C. M. Barnitz.
Jan.	14-15, London,	Mercer,	F. H. Fassett and Fred W. Card.
Jan.	17-18, Prospect,	Butler,	F. H. Fassett and Fred W. Card.
Jan.	19-20, Bruin,	Butler,	F. H. Fassett and Fred W. Card.
Jan.	21-22, Evans City,	Butler,	F. H. Fassett and Fred W. Card.
Jan. 31-Feb. 1,	Spring Church,	Armstrong,	F. H. Fassett and Fred W. Card.
Feb,	2-3, Brick Church,	Armstrong,	F. H. Fassett and Fred W. Card.
Feb.	4-5, Cowansville,	Armstrong,	F. H. Fassett and Fred W. Card.
Feb.	7-8, Clarion,	Clarion,	F. H. Fassett, Fred W. Card and Dr. Hannah McK. Lyons.
Feb.	9, Miola,	Clarion,	F. H. Fassett, Fred W. Card and Dr. Hannah McK. Lyons.
Feb.	10, Frogtown,	Clarion,	F. H. Fassett, Fred W. Card and Dr. Hannah McK. Lyons.
Feb.	11-12, Sligo,	Clarion,	F. H. Fassett, Fred W. Card and Dr. Hannah McK. Lyons.
Feb.	14-15, Rockland,	Venango,	F. H. Fassett, Fred W. Card and Geo. E. Hull.
Feb.	16-17, Dempseytown,	Venango,	F. H. Fassett, Fred W. Card and Geo. E. Hull.
Feb.	18-19, Cochrannton,	Crawford,	F. H. Fassett, Fred W. Card and Geo. E. Hull.
Feb.	21-22, Conneaut Lake,	Crawford,	F. H. Fassett and Fred W. Card.
Feb.	23-24, Dicksonburg,	Crawford,	F. H. Fassett and Fred W. Card.
Feb.	25-26, Townville,	Crawford,	F. H. Fassett and Fred W. Card.
Feb.	28-29, West Green Grange Erie,	Erie,	F. H. Fassett and Fred W. Card.
March	1-2, North East,	Erie,	F. H. Fassett and Fred W. Card.
March	3-4, Girard,	Erie,	F. H. Fassett and Fred W. Card.

FOURTH SECTION

WM. M. PATTON will attend all meetings in this section.

Date.	Place.	County.	Additional Lecturers.
Nov. 15-16,	Kane,	McKean,	Paul R. Guldin, Dr. M. E. Conard and L. W. Lighty.
Nov. 17-18,	Ceres,	McKean,	Paul R. Guldin, Dr. M. E. Conard and L. W. Lighty.
Nov. 19-20,	Oswayo,	Potter,	Paul R. Guldin, Dr. M. E. Conard and L. W. Lighty.
Nov. 22-23,	Genesee,	Potter,	Paul R. Guldin, Dr. M. E. Conard and L. W. Lighty.
Nov. 24,	Ulysses,	Potter,	Paul R. Guldin, Dr. M. E. Conard and L. W. Lighty.
Nov. 26-27,	Westfield,	Tioga,	Geo. L. Gillingham and L. W. Lighty.
Nov. 29-30,	Wellsboro,	Tioga,	Geo. L. Gillingham and L. W. Lighty.
Dec. 1,	Jobs Corner,	Tioga,	Geo. L. Gillingham and L. W. Lighty.
Dec. 2-3,	Mansfield,	Tioga,	Geo. L. Gillingham and L. W. Lighty.
Dec. 4,	Liberty,	Tioga,	Geo. L. Gillingham and L. W. Lighty.
Dec. 10-11,	Muncy Valley,	Sullivan,	Geo. L. Gillingham and L. W. Lighty.
Dec. 13-14,	Colley,	Sullivan,	Geo. L. Gillingham and L. W. Lighty.
Dec. 15-16,	Wilmont,	Bradford,	Geo. L. Gillingham and L. W. Lighty.
Dec. 17-18,	Stevensville,	Bradford,	Geo. L. Gillingham and L. W. Lighty.
Dec. 20-21,	Lime Hill,	Bradford,	Geo. L. Gillingham and L. W. Lighty.
Dec. 22-23,	Rome,	Bradford,	Geo. L. Gillingham and L. W. Lighty.
Jan. 3,	Dimock,	Susquehanna,	H. M. Gooderham and Dr. W. T. Phillipy.
Jan. 4-5,	Harford,	Susquehanna,	H. M. Gooderham and Dr. W. T. Phillipy.
Jan. 6,	Clifford,	Susquehanna,	H. M. Gooderham and Dr. W. T. Phillipy.
Jan. 7-8,	Thompson,	Susquehanna,	H. M. Gooderham and Dr. W. T. Phillipy.
Jan. 10,	Orson,	Wayne,	H. M. Gooderham and Leon Otice Van Noy.
Jan. 11-12,	Pleasant Mount,	Wayne,	H. M. Gooderham and Leon Otice Van Noy.
Jan. 13,	Aldenville,	Wayne,	H. M. Gooderham and Leon Otice Van Noy.
Jan. 14-15,	Honesdale,	Wayne,	H. M. Gooderham and Leon Otice Van Noy.
Jan. 17-18,	Greentown,	Pike,	H. M. Gooderham and Leon Otice Van Noy.
Jan. 19-20,	Paupack,	Pike,	H. M. Gooderham and Leon Otice Van Noy.
Jan. 21-22,	Egypt Mills,	Pike,	H. M. Gooderham and Leon Otice Van Noy.
Feb. 1-2,	Sugargrove,	Warren,	Prof. Wells W. Cooke and C. M. Barnitz.
Feb. 3,	Youngsville,	Warren,	Prof. Wells W. Cooke and C. M. Barnitz.
Feb. 4-5,	Warren,	Warren,	Prof. Wells W. Cooke and C. M. Barnitz.
Feb. 7-8,	Tionesta,	Forest,	Prof. Wells W. Cooke and C. M. Barnitz.
Feb. 9-10,	Clarrington,	Forest,	Prof. Wells W. Cooke and C. M. Barnitz.

Date.	Place.	County.	Additional Lecturers.
Feb.	11-12, St. Marys,	Elk,	Prof. Wells W. Cooke and J. Stuart Groupe.
Feb.	14-15, Weedville,	Elk,	Prof. Wells W. Cooke and J. Stuart Groupe.
Feb.	16-17, Zion Church,	Jefferson,	Dr. Hannah McK. Lyons and J. Stuart Groupe.
Feb.	18-19, Beachwood,	Jefferson,	Dr. Hannah McK. Lyons and J. Stuart Groupe.
Feb.	21-22, Emporium,	Cameron,	Dr. Hannah McK. Lyons and J. Stuart Groupe.
Feb.	23-24, Woolrich,	Clinton,	Dr. Hannah McK. Lyons and C. M. Barnitz.
Feb.	25-26, Mackeyville,	Clinton,	Dr. Hannah McK. Lyons and C. C. Hulsart.
Feb.	28, Loganton,	Clinton,	Dr. Hannah McK. Lyons and C. C. Hulsart.
Feb.	29, Friedens Church,	Lycoming,	Dr. Hannah McK. Lyons, C. C. Hulsart and W. H. Stout.
March	1-2, Montgomery,	Lycoming,	Dr. Hannah McK. Lyons, C. C. Hulsart and W. H. Stout.
March	3-4, Hughesville,	Lycoming,	Dr. Hannah McK. Lyons, C. C. Hulsart and W. H. Stout.

FIFTH SECTION

J. T. CAMPBELL will attend all meetings in this section.

Date.	Place.	County.	Additional Lecturers.
Nov.	18-19, Monroe Grange,	Monroe,	Prof. T. I. Mairs and C. C. Hulsart.
Nov.	20, T. nnersville,	Monroe,	Prof. T. I. Mairs and C. C. Hulsart.
Nov.	22-23, Gilbert,	Monroe,	Prof. T. I. Mairs and C. C. Hulsart.
Nov.	24-25, Big Creek,	Carbon,	Fred W. Card, C. C. Hulsart and Vern T. Struble.
Nov.	26-27, Mahoning,	Carbon,	Fred W. Card, C. C. Hulsart and Vern T. Struble.
Nov.	29-30, Weatherly,	Carbon,	Fred W. Card, C. C. Hulsart and Vern T. Struble.
Dec.	1-2, Daleville,	Lackawanna,	Fred W. Card, W. R. White and Vern T. Struble.
Dec.	3-4, Tompkinsville,	Lackawanna,	Fred W. Card, W. R. White and Vern T. Struble.
Dec.	6-7, Bald Mount,	Lackawanna,	Fred W. Card, W. R. White and Vern T. Struble.
Dec.	13-14, Hobbie,	Luzerne,	Fred W. Card and Vern T. Struble.
Dec.	15-16, Bloomingdale,	Luzerne,	Fred W. Card and Vern T. Struble.
Dec.	17-18, Dallas,	Luzerne,	Fred W. Card and Vern T. Struble.
Dec.	20-21, Tunkhannock,	Wyoming,	Fred W. Card and Vern T. Struble.
Dec.	22-23, East Lemon,	Wyoming,	Fred W. Card and Vern T. Struble.
Jan.	3-4, Summit,	Schuylkill,	John D. Herr, Prof. Franklin Menges and M. S. Bond.

Date.	Place.	County.	Additional Lecturers.
Jan.	5, Klingerstown,	Schuylkill,	John D. Herr, Prof. Franklin Menges and M. S. Bond.
Jan.	6, Pitman,	Schuylkill,	John D. Herr, Prof. Franklin Menges and M. S. Bond.
Jan.	7-8, Andreas,	Schuylkill,	John D. Herr, Prof. Franklin Menges and M. S. Bond.
Jan.	10-11, Nazareth,	Northampton,	John D. Herr, Prof. Franklin Menges and W. H. Darst.
Jan.	12-13, Mount Bethel,	Northampton,	John D. Herr, Prof. Franklin Menges and W. H. Darst.
Jan.	14-15, Cherryville,	Northampton,	John D. Herr, Prof. Franklin Menges and W. H. Darst.
Jan.	17-18, Pleasant Corner,	Lehigh,	John D. Herr and R. J. Weld.
Jan.	19-20, Seipstown,	Lehigh,	John D. Herr and R. J. Weld.
Jan.	21-22, Macungie,	Lehigh,	John D. Herr and R. J. Weld.
Jan. 31-Feb. 1,	Springtown,	Bucks,	John D. Herr and Leon Otice Van Noy.
Feb.	2-3, Sellersville,	Bucks,	John D. Herr and Leon Otice Van Noy.
Feb.	4, Bristol,	Bucks,	John D. Herr and Leon Otice Van Noy.
Feb.	5, New Hope,	Bucks,	John D. Herr and Leon Otice Van Noy.
Feb.	7-8, Newtown,	Bucks,	John D. Herr and Leon Otice Van Noy.
Feb.	9, Plymouth Meeting,	Montgomery,	Leon Otice Van Noy and C. C. Hulsart.
Feb.	10-11, Worcester,	Montgomery,	Leon Otice Van Noy and C. C. Hulsart.
Feb.	12, Harleysville,	Montgomery,	Leon Otice Van Noy and C. C. Hulsart.
Feb.	14-15, Trappe,	Montgomery,	Leon Otice Van Noy and C. C. Hulsart.
Feb.	16-17, East Greenville,	Montgomery,	Leon Otice Van Noy and C. C. Hulsart.
Feb.	18-19, Village Green,	Delaware,	Leon Otice Van Noy and C. C. Hulsart.
Feb.	21-22, Williamson School, ..	Delaware,	Leon Otice Van Noy and C. C. Hulsart.
Feb.	23-24, Philadelphia,	Philadelphia,	Leon Otice Van Noy and C. C. Hulsart.

MOVABLE INSTITUTE SCHOOLS

DIRECTIONS TO COUNTY CHAIRMEN AND COMMITTEES OF ARRANGEMENTS

The following outline of Dairy, Horticultural and Poultry Topics form the basis of such instruction as will be taken up at the Movable Institute Schools. At a four-day meeting, two days will be devoted to Dairy Instruction and two days divided between Horticulture and Poultry interests. In preparing program, please select such topics as will be best suited for your locality, arranging for the speakers on such days as they are scheduled in Institute Bulletin. We recommend that at least one session relating to the Dairy Barn, Its Ventilation, etc., be held in a suitable Dairy Barn, also that one Horticultural session be held in a nearby Orchard, if the weather will permit. A lady speaker will be in attendance at one or more days at each school to give instruction on Household Economics, Home Sanitation and Domestic Science and should be placed on program for evening session.

SCHOOL OF HORTICULTURE

Session I

Starting an Orchard:

- Care and management
- Pruning; how, when and what for
- Spraying and marketing.

Root System:

- Structure of root
- Functions
- Absorption of food
- Conduction
- Effect of root pruning
- Root injury.

Trunk and Branches:

- Structure of stem
- What is cambium
- Function of stem
- Buds
- Relative to pruning.

Session II

How to Feed a Tree:

- Fertilizers
- Barnyard manure
- Wood ashes

Lime
 Commercial fertilizers
 Mulches-sod mulches
 Cultivation
 Cover crops.

Session III

Varieties of Fruits:
 Top working varieties
 Adaptation of varieties
 Importance of local varieties
 Change of latitude
 Self sterility of fruits
 Mixing varieties of orchards
 How to choose varieties
 Types of apples.

Session IV

BUSINESS PROBLEMS OF THE ORCHARD

Subject—*Harvesting and Marketing Fruit.*

When to pick and how
 Picking devices
 Effect of sun on picked fruit
 Effect of rain on picked fruit
 Effect of frost on picked fruit
 Packing and packages
 Packing houses and conveniences
 Storing and storing houses
 Shipping—associations
 Demands of the market
 Value of business methods
 Value of co-operation.
 Practicum—To be announced.

Session V

Orchard Insects:
 Codling moth
 Apple tree borer
 Scale insects
 Canker worm
 Peach tree borer
 Curculio
 Rose chafer.

Session VI

Fungus Diseases:

Apple scale
 Apple leaf spot
 Apple rust
 Apple twig blight
 Apple canker
 Crown gall
 Peach yellows
 Leaf curl
 Brown rot
 Pear tree blight
 Pear leaf blight.

Strawberries:

SCHOOL OF DAIRYING
Subject—*The Dairy Barn.*

Plan and arrangement
 Its convenience
 Tools and implements, where kept and what are needed.
 The cow stall
 Material of stall
 The dimensions
 The floor drop
 Manure gutter; how made.

Practicum—An hour will be devoted to the examination of the Dairy Barn.

Subject—*Light.*

Windows, where located
 How constructed
 Effect upon the animal.

Subject—*Ventilation.*

A suitable intake system
 The outlet for air
 Convenient arrangement of doors and chutes
 Ceiling construction.

Subject—*Profitable Feeding.*

Short cut hay, fodder and ensilage
 Ground grain and products of mills
 Balance the feed to suit the cow
 How to balance a ration
 How to count profit and loss in feeding
 Best hay, fodder and silage
 How often should cows be fed.

Subject—*Care and Management of the Cow.*

How to keep a cow warm in winter
How to water and salt a cow
How to curry, bed and clean a cow.

Subject—*The Dairy Cow.*

Selection of breed adapted to climatic and soil conditions
Her breeding; the sire and dam
Conformation
The proper formed udder and teats.

Subject—*Raising the Calf.*

What does it cost to raise a calf to be a cow
How fed
When fed
What shall constitute the feed.

Practice in testing milk products.	Lecture on cream ripening with cream to be set.
Testing of samples to show variations daily, time of milking first and last milk, daily, speed temperature, flushing.	Churning and packing for market accompanying by explanation.
Butter judging, acid test, fermentations.	
Test three-day comp. samples from different herds. Cows to be in pairs same time in milk.	

EXERCISE I

BABCOCK TEST: The quality of milk and cream depends largely on the butter-fat in it.

To learn the amount of fat find the weight of milk and the per cent. of fat.

The Babcock Test merely tells what per cent. of the material is fat.

THE PRINCIPLE: The breaking up of the milk, or cream, etc., by sulphuric acid setting the fat free; separating it from the other constituents by means of centrifugal force, this being done in a bottle graduated to show the per cent. of fat.

VITAL: Features are a fair sample, an accurate measure of the amount used, complete separation, and accurate reading of the results, at proper temperature.

THE MILK: To be tested, fair sample, thoroughly mixed, pouring if practicable, sample measured with a pipette, 17-6 c. c. See that end is not broken. Milk should be ordinary room temperature.

THE ACID: Commercial sulphuric, strength, 1:82 sp. gr.; amount, 17.5 c. c.

Strong acid chars the fat—use less of it.

Weak acid shows white sediment in fat column, use more of it. Slant bottle so ingoing acid runs down side of bottle. Mix with the milk at once.

Whirl five minutes, add hot water up to neck, whirl one minute, add water to 8 mark, whirl one minute, read. If using hand tester and room is cool, place bottle in bath at 120 for two or three minutes before reading.

Read from top of upper meniscus to bottom of lower.

Empty while warm, rinse, wash with alkali water, rinse.

CREAM: To test it the amount required should be weighed into the sample bottle, because the variation in its richness, the amount that will adhere to the pipette and the gas and air mixed in it by hauling or standing, make it impossible to measure the required amount accurately. The amount, 18 grains, or half this amount, in the latter case, with the ordinary cream bottle the reading would have to be doubled.

The amount of aid used with cream should be reduced a little, and after it is mixed with the cream should be allowed to stand a few minutes.

SKIM MILK: Tested the same as whole milk, except that a little more acid is required. The speed of the tester should be increased. A double neck skim milk bottle is required, especially for separator skim milk.

EXERCISE II

The per cent. of fat in milk varies with different cows, with different breeds, with the same cow from day to day, from one milking to another, with change of feed, change of weather, fright, abuse, noise that is unusual, if not accustomed to them, the presence of strangers at milking time may cause variation. The per cent. of fat in the milk is usually lower soon after the cow is fresh, than it is later in the period of lactation; with many cows the per cent. of increase slightly as the cow gets older. It is usually highest for the shortest period between milkings, and when these are equal for the one during which there has been most activity. The per cent. of fat is more influenced by nervous condition of the animal and individuality than by feed.

In separator cream, the per cent. of fat varies, because of variation of the per cent. of fat in the milk separated, temperature of milk at separating time, fullness of the supply can, speed of the separator, the amount of skim milk, or water, used in flushing the bowl.

In separator skim milk the increased per cent. of fat may be due, slow speed of separator, cold milk, irregular speed, machine not standing steady and firm.

EXERCISE III

Scoring butter according to a score card, is but expressing in mathematical terms, the quality of butter. As yet no way has been devised for measuring the quality of butter, except to depend on the judgment of those skilled in the work. The score card;

Flavor,	45
Body,	25
Color,	15
Salt,	10
Style,	5
Total,	100

FLAVOR: Should be mild rich creamy, with a delicate mild pleasant aroma.

Some of the common faults of flavor; flat, lacking in the flavor due to proper development of the lactic acid, rancid due to over ripe cream, old cream, unclean, showing the effect of unclean milking, unclean utensils, surroundings, or methods. Weedy presence of flavors probably caused by undesirable feeds. Feverish, from milk from cows not in good health or too soon after freshening, or during sexual excitement. Smothered, due to closing the can of milk before properly cooling, or exposing closed can of milk to hot sun enroute to creamery. Fruity, or vegetables flavors, caused by presence of decaying vegetables or fruit. Dish rag, due to wiping utensils with the dish cloth, instead of thoroughly scalding with boiling water and allowing to dry.

BODY: Should be firm and wavy, not brittle, greasy, tallowy, spongy, sticky, or salvy.

COLOR: Should be uniform and even, free from streaks, mottles, curds.

SALT: Should be of desired amount, thoroughly dissolved, free from grit and evenly distributed.

STYLE: Package should be neat, clean, and tight.

EXERCISE IV

This exercise to be devoted to testing samples of milk brought in by members of the class, and taken so as to show the difference in the variations in the composition of milk. To emphasize the value of knowing what each cow is producing in return for the feed she is consuming, to show how an approximate record may be kept with little real work.

Material required for keeping such records.

A spring balance, good one costs \$4.00 though a much cheaper one will answer fairly well.

Sample jars, one for each cow, may be common fruit jars or milk jars, but should have covers.

A Babcock Tester that need not cost over \$5.00.

The discovery of and removal from the herd of one or two cows that are eating more dollars worth of grain, hay and pasture than they are producing milk and butter fat to pay for will many times over pay for the labor and expense involved, especially when it is recalled that some cows produce \$75.00 and \$80.00 worth of butter fat for \$35.00 or \$40.00 worth of feed.

EXERCISE V**Principles of Sanitary Milk Production.****Facts of Value to Dairymen about Bacteria in Milk.**

A milk sheet, which may be ruled up on common brown paper as follows:

DATE.	Name of Cow.	Name of Cow.	Name of Cow.	Name of Cow.	

SCHOOL OF POULTRY HUSBANDRY**Subject—*Breeds.***

Short history of the various breeds. Origin, types and future advantages of pure bred flocks.

Principals of breeding, particularly along the line of increased egg production.

Effects of selection, cross-breeding, line breeding and inbreeding.

Subject—*Foods and Feeding.*

Purposes of feeding.

Comparative value of the various grains.

How best to feed and when.

Feeding for eggs, for growth, for fattening, etc.

Green food, animal food, shell and bone food, charcoal condiments.

Subject—*Houses and Yards.*

Colony, continuous house and free range plans.

Situations, soils and exposures.

Advantages of low cost, construction and simplicity.

Wide open and curtain front, fresh air houses.

Subject—*Easy and Simple Methods of Poultry Keeping.*

Why such methods are best.

Where most people fall down.

Advantages of poultry keeping; vast importance and extent of same.

Subject—Incubation.

The advantages and disadvantages of natural and artificial incubation compared.

Necessary adjuncts of good hatches.

Subject—Brooding and Rearing.

Natural methods of brooding.

Cold brooders; artificially heated brooders.

The first feed for chicks.

Extreme importance and desirability of uninterrupted or unchecked growth.

Subject—Winter Egg Production.

Factors making the same.

Selecting and handling the layers.

Housing and feeding.

Marketing the eggs.

Note—Besides the list of the various Poultry Journals and the bulletins on Poultry Keeping issued by the National and various State Departments of Agriculture, those interested in Poultry Keeping should secure and study Poultry Craft, by Robinson; Progressive Poultry Culture, by Bingham; The New Book on Poultry, by Wright; Poultry Culture, by Felch; and A Living from Poultry, by Boyer.

MOVABLE INSTITUTE SCHOOLS

Season 1915-1916.

Date.	Place.	County.	Lecturers.
Jan. 4-5,	Jerseytown,	Columbia,	W. Theo. Wittman and F. H. Fassett.
Jan. 6,	Jerseytown,	Columbia,	Dr. M. E. Conard, R. J. Weld and Dr. Hannah McK. Lyons.
Jan. 6,	Numidia,	Columbia,	W. Theo. Wittman and F. H. Fassett.
Jan. 7-8,	Numidia,	Columbia,	Dr. M. E. Conard, R. J. Weld and Dr. Hannah McK. Lyons.
Jan. 7-8,	Mausdale,	Montour,	W. Theo. Wittman and F. H. Fassett.
Jan. 10-11,	Mausdale,	Montour,	Dr. M. E. Conard, R. J. Weld and Dr. Hannah McK. Lyons.
Jan. 10-11,	Salix,	Cambria,	W. Theo. Wittman and F. H. Fassett.
Jan. 12-13,	Salix,	Cambria,	Dr. M. E. Conard, R. J. Weld and Dr. Hannah McK. Lyons.

LIST OF SPEAKERS AND THEIR ASSIGNMENTS

FOR SEASON OF 1915-1916.

H. M. ANDERSON, New Park, York County, Pa.

Date.	Place.	County.
Jan. 3-4,.....	Schaefferstown,	Lebanon.
Jan. 5-6,.....	Annaville,	Lebanon.
Jan. 7-8,.....	Jonestown,	Lebanon.
Jan. 10-11,.....	Dry Run,	Franklin.
Jan. 12-13,.....	Fannettsburg,	Franklin.
Jan. 14,.....	Marion,	Franklin.
Jan. 15,.....	Scotland,	Franklin.

C. M. BARNITZ, Riverside, Northumberland County, Pa.

Nov. 19-20,.....	Blue Ball,	Lancaster.
Nov. 22-23,.....	Lampeter,	Lancaster.
Nov. 26-27,.....	Paradise,	Lancaster.
Nov. 29-30,.....	Mechanicsville,	Lancaster.
Dec. 1-2,.....	Lititz,	Lancaster.
Dec. 3-4,.....	Maytown,	Lancaster.
Jan. 3-4,.....	Moravia,	Lawrence.
Jan. 5-6,.....	Plaingrove,	Lawrence.
Jan. 7-8,.....	Pulaski,	Lawrence.
Jan. 10-11,.....	Greenville,	Mercer.
Jan. 12-13,.....	Mercer,	Mercer.
Jan. 14-15,.....	London,	Mercer.
Feb. 1-2,.....	Sugargrove,	Warren.
Feb. 3,.....	Youngsville,	Warren.
Feb. 4-5,.....	Warren,	Warren.
Feb. 7-8,.....	Tionesta,	Forest.
Feb. 9-10,.....	Clarrington,	Forest.
Feb. 23-24,.....	Woolrich,	Clinton.

G. C. BUCKLEY, State College, Centre County, Pa.

Jan. 10-11,.....	Greenville,	Mercer.
Jan. 12,.....	Mercer,	Mercer.

S. I. BECHDEL, Department of Dairy Husbandry, State College,
Centre County, Pa.

	Date.	Place.	County.
Dec.	13-14,.....	Millheim,	Centre.
Dec.	15-16,.....	Pine Grove Mills,	Centre.

M. S. BOND, Danville, Montour County, Pa.

Jan	3-4,.....	Summit,	Schuylkill.
Jan.	5,.....	Klingerstown,	Schuylkill.
Jan.	6,.....	Pitman,	Schuylkill.
Jan.	7-8,.....	Andreas,	Schuylkill.

J. T. CAMPBELL, Hartstown, Crawford County, Pa.

Will attend all meetings in the FIFTH SECTION.

FRED W. CARD, Sylvania, Bradford County, Pa.

Will attend all meetings in the FIFTH SECTION Nov. 24 to Dec. 23, and the THIRD SECTION from Jan. 14 to March 4.

DR. M. E. CONARD, Westgrove, Chester County, Pa.

Nov.	15-16,.....	Kane,	McKean.
Nov.	17-18,.....	Ceres,	McKean.
Nov.	19-20,.....	Oswayo,	Potter.
Nov.	22-23,.....	Genessee,	Potter.
Nov.	24,.....	Ulysses,	Potter.
Jan.	6,.....	Jerseytown,	Columbia.
Jan.	7-8,.....	Numidia,	Columbia.
Jan.	10-11,.....	Mausdale,	Montour.
Jan.	12-13,.....	Salix,	Cambria.

PROF. WILLS W. COOKE, U. S. Dept. of Agriculture, Wash-
ington, D. C.

Nov.	29-30,.....	Mechanicsville,	Lancaster.
Dec.	1-2,.....	Lititz,	Lancaster.
Dec.	3-4,.....	Maytown,	Lancaster.
Feb.	1-2,.....	Sugargrove,	Warren.
Feb.	3,.....	Youngsville,	Warren.
Feb.	4-5,.....	Warren,	Warren.
Feb.	7-8,.....	Tionesta,	Forest.
Feb.	9-10,.....	Clarrington,	Forest.
Feb.	11-12,.....	St. Marys,	Elk.
Feb.	14-15,.....	Weedville,	Elk.

W. H. DARST, State College, Centre County, Pa.

	Date.	Place.	County.
Jan.	10-11,.....	Nazareth,	Northampton.
Jan.	12-13,.....	Mount Bethel,	No. thampton.
Jan.	14-15,.....	Cherryville,	No. thampton.

E. B. DORSETT, Mansfield, Tioga County, Pa.

Will attend all meetings in the **THIRD SECTION**.

F. H. FASSETT, Meshoppen, Wyoming County, Pa.

Will attend all meetings in the **THIRD SECTION** from Nov. 15 to Dec. 4, and Jan. 14 to March 4; Movable Institute Schools Jan. 4-5, Jerseytown, Jan. 6, Numidia, Jan. 7-8, Mausdale, Jan. 10-11, Salix.

SHELDON W. FUNK, Boyertown, Berks County, Pa.

Will attend all meetings in the **FIRST SECTION**.

S. C. GEORGE, West Lebanon, Indiana County, Pa.

Jan. 31-Feb. 1,.....	Gratz,	Dauphin.
Feb. 2-3,.....	Halifax,	Dauphin.
Feb. 4-5,.....	Linglestown,	Dauphin.

G. L. GILLINGHAM, Moorestown, N. J.

Nov.	26-27,.....	Westfield,	Tioga.
Nov.	29-30,.....	Wellsboro,	Tioga.
Dec.	1,.....	Jobs Corner,	Tioga.
Dec.	2-3,.....	Mansfield,	Tioga.
Dec.	4,.....	Liberty,	Tioga.
Dec.	10-11,.....	Muncy Valley,	Sullivan.
Dec.	13-14,.....	Colley,	Sullivan.
Dec.	15-16,.....	Wilmont,	Bradford.
Dec.	17-18,.....	Stevensville,	Bradford.
Dec.	20-21,.....	Lime Hill,	Bradford.
Dec.	22-23,.....	Rome,	Bradford.

H. M. GOODERHAM, Patton, Cambria County, Pa.

Date.	Place.	County.
Jan. 3,.....	Dimock,	Susquehanna.
Jan. 45,.....	Harford,	Susquehanna.
Jan. 6,.....	Clifford,	Susquehanna.
Jan. 7-8,.....	Thompson,	Susquehanna.
Jan. 10,.....	Orson,	Wayne.
Jan. 11-12,.....	Pleasant Mt.,	Wayne.
Jan. 13,.....	Aldenville,	Wayne.
Jan. 14-15,.....	Honesdale,	Wayne.
Jan. 17-18,.....	Greentown,	Pike.
Jan. 19-20,.....	Paupack,	Pike.
Jan. 21-22,.....	Egypt Mills,	Pike.

J. STUART GROUPE, Jersey Shore, Lycoming County, Pa.

Nov. 19-20,.....	Ohio pyle,	Fayette.
Nov. 22-23,.....	Old Frame,	Fayette.
Nov. 24,.....	Tippecanoe,	Fayette.
Nov. 26,.....	Elders Ridge,	Indiana.
Nov. 27,.....	Shelocta,	Indiana.
Nov. 29-30,.....	Flora,	Indiana.
Dec. 1-2,.....	Pine Flats,	Indiana.
Dec. 3-4,.....	Wilgus,	Indiana.
Feb. 11-12,.....	St. Marys,	Elk.
Feb. 14-15,.....	Weedville,	Elk.
Feb. 16-17,.....	Zion Church,	Jefferson.
Feb. 18-19,.....	Beachwood,	Jefferson.
Feb. 21-22,.....	Emporium,	Cameron.

PAUL R. GULDIN, Yellow House, Berks County, Pa.

Nov. 15-16,.....	Kane,	McKean.
Nov. 17-18,.....	Ceres,	McKean.
Nov. 19-29,.....	Oswayo,	Potter.
Nov. 22-23,.....	Genesee,	Potter.
Nov. 24,.....	Ulysses,	Potter.

J. A. HERMAN, Fombell, Beaver County, Pa.

Nov. 15-16,.....	Scenery Hill,	Washington.
Nov. 17-18,.....	Ginger Hill,	Washington.
Nov. 19-20,.....	Old Concord,	Washington.
Nov. 22-23,.....	Hanover U. P. Church,	Beaver.
Nov. 24-25,.....	Ohio Grange Hall,	Beaver.
Nov. 26-27,.....	Chippewa Grange Hall,	Beaver.

	Date.	Place.	County.
Nov.	29-30,	Millerstown,	Allegheny.
Dec.	1-2,	Perryville,	Allegheny.
Dec.	3-4,	Mt. Union,	Allegheny.

JOHN D. HERR, Lancaster, Lancaster County, Pa.

Jan.	3-4,	Summit,	Schuylkill.
Jan.	5,	Klingerstown,	Schuylkill.
Jan.	6,	Pitman,	Schuylkill.
Jan.	7-8,	Andreas,	Schuylkill.
Jan.	10-11,	Nazareth,	Northampton.
Jan.	12-13,	Mount Bethel,	Northampton.
Jan.	14-15,	Cherryville,	Northampton.
Jan.	17-18,	Pleasant Corner,	Lehigh.
Jan.	19-20,	Seipstown,	Lehigh.
Jan.	21-22,	Macungie,	Lehigh.
Jan. 31-Feb. 1,		Springtown,	Bucks.
Feb.	2-3,	Sellersville,	Bucks.
Feb.	4,	Bristol,	Bucks.
Feb.	5,	New Hope,	Bucks.
Feb.	7-8,	Newtown,	Bucks.

C. C. HULSART, Matawan, N. J.

Nov.	18-19,	Monroe Grange,	Monroe.
Nov.	20,	Tannersville,	Monroe.
Nov.	22-23,	Gilbert,	Monroe.
Nov.	24-25,	Big Creek,	Carbon.
Nov.	26-27,	Mahoning,	Carbon.
Feb.	9,	Weatherly,	Carbon.
Nov.	29-30,	Plymouth Meeting,	Montgomery.
Feb.	10-11,	Worcester,	Montgomery.
Feb.	12,	Harleysville,	Montgomery.
Feb.	14-15,	Trappe,	Montgomery.
Feb.	16-17,	East Greenville,	Montgomery.
Feb.	18-19,	Village Green,	Delaware.
Feb.	21-22,	Williamson School,	Delaware.
Feb.	23-24,	Philadelphia,	Philadelphia.
Feb.	25-26,	Mackeyville,	Clinton.
Feb.	28,	Loganton,	Clinton.
Feb.	29,	Friedens Church,	Lycoming.
March	1-2,	Montgomery,	Lycoming.
March	3-4,	Hughesville,	Lycoming.

GEO. E. HULL, Sharpsville, Mercer County, Pa.

	Date.	Place.	County.
Jan.	14-15,.....	Rockland,	Venango.
Jan.	16-17,.....	Dempseytown,	Venango.
Jan.	18-19,.....	Cochrannton,	Crawford.

L. W. LIGHTY, East Berlin, Adams County, Pa.

Nov.	15-16,.....	Kane,	McKean.
Nov.	17-18,.....	Ceres,	McKean.
Nov.	19-20,.....	Oswayo,	Potter.
Nov.	22-23,.....	Genessee,	Potter.
Nov.	24,.....	Ulysses,	Potter.
Nov.	26-27,.....	Westfield,	Tioga.
Nov.	29-30,.....	Wellsboro,	Tioga.
Dec.	1,.....	Jobs Corner,	Tioga.
Dec.	2-3,.....	Mansfield,	Tioga.
Dec.	4,.....	Liberty,	Tioga.
Dec.	10-11,.....	Muncy Valley,	Sullivan.
Dec.	13-14,.....	Colley,	Sullivan.
Dec.	15-16,.....	Wilmont,	Bradford.
Dec.	17-18,.....	Stevensville,	Bradford.
Dec.	20-21,.....	Lime Hill,	Bradford.
Dec.	22-23,.....	Rome,	Bradford.
Feb.	21-22,.....	Balley,	Berks.
Feb.	23-24,.....	Mt. Aetna,	Berks.
Feb.	25-26,.....	Temple,	Berks.
Feb.	28,.....	Jacksonwald,	Berks.
Feb.	29,.....	Geigertown,	Berks.
March	1-2,.....	Cedarville,	Chester.
March	3-4,.....	Beyers,	Chester.
March	6-7,.....	Parkesburg,	Chester.
March	8-9,.....	Doe Run,	Chester.

DR. HANNAH McK. LYONS, Lincoln University, Chester County, Pa.

Jan.	6,.....	Jerseytown,	Columbia.
Jan.	7-8,.....	Numidia,	Columbia.
Jan.	10-11,.....	Mausdale,	Montour.
Jan.	12-13,.....	Salix,	Cambria.
Feb.	7-8,.....	Clarion,	Clarion.
Feb.	9,.....	Miola,	Clarion.
Feb.	10,.....	Frogtown,	Clarion.

	Date.	Place.	County.
Feb.	11-12,.....	Sligo,	Clarion.
Feb.	16-17,.....	Zion Church,	Jefferson.
Feb.	18-19,.....	Beachwood,	Jefferson.
Feb.	21-22,.....	Emporium,	Cameron.
Feb.	23-24,.....	Woolrich,	Clinton.
Feb.	25-26,.....	Mackeyville,	Clinton.
Feb.	28,.....	Loganton,	Clinton.
Feb.	29,.....	Friedens Church,	Lycoming.
March	1-2,.....	Montgomery,	Lycoming.
March	3-4,.....	Hughesville,	Lycoming.

PROF. THOS. I. MAIRS, State College, Centre County, Pa.

Nov.	18-19,.....	Monroe Grange,	Monroe.
Nov.	20,.....	Tannersville,	Monroe.
Nov.	22-23,.....	Gilbert,	Monroe.

M. H. McCALLUM, Wernersville, Berks County, Pa.

Will attend all meetings in the **SECOND SECTION** from Dec. 13 to Feb. 19.

C. C. McCURDY, Hartstown, Crawford County, Pa.

Nov.	26,.....	Elders Ridge,	Indiana.
Nov.	27,.....	Shelocta,	Indiana.
Nov.	29-30,.....	Flora,	Indiana.
Dec.	1-2,.....	Pine Flats,	Indiana.
Dec.	3-4,.....	Wilgus,	Indiana.

PROF. FRANKLIN MENGES, York, York County, Pa.

Jan.	3-4,.....	Summit,	Schuylkill.
Jan.	5,.....	Klingerstown,	Schuylkill.
Jan.	6,.....	Pitman,	Schuylkill.
Jan.	7-8,.....	Andreas,	Schuylkill.
Jan.	10-11,.....	Nazareth,	Northampton.
Jan.	12-13,.....	Mount Bethel,	Northampton.
Jan.	14-15,.....	Cherryville,	Northampton.
Jan.	17-18,.....	Newburg,	Cumberland.
Jan.	19-20,.....	Centerville,	Cumberland.
Jan.	21-22,.....	Hogestown,	Cumberland.

C. E. MYERS, State College, Centre County, Pa.

	Date.	Place.	County.
Nov.	29-30,.....	Mechanicsville,	Lancaster.
Dec.	1-2,.....	Lititz,	Lancaster.
Dec.	3-4,.....	Maytown,	Lancaster.

CHAS. F. NOLL, State College, Centre County, Pa.

Feb.	14-15,.....	Dover,	York.
Feb.	16-17,.....	Loganville,	York.
Feb.	18-19,.....	Red Lion,	York.

PROF. C. R. ORTON, State College, Centre County, Pa.

Nov.	19-20,.....	Ohiopyle,	Fayette.
Nov.	22-23,.....	Old Frame,	Fayette.
Nov.	24,.....	Tippecanoe,	Fayette.

WM. M. PATTON, Mosgrove, R. D. No. 2, Armstrong County, Pa.

Will attend all meetings in the **FOURTH SECTION**.

T. J. PHILIPS, Atglen, Chester County, Pa.

Dec.	20,.....	Irwin,	Westmoreland.
Dec.	21-22,.....	Greensburg,	Westmoreland.
Dec.	23,.....	Latrobe,	Westmoreland.

E. L. PHILLIPS, New Bethlehem, R. D. No. 2, Clarion County, Pa.

Will attend all meetings in the **FIRST SECTION** from Dec. 13 to Dec. 23 and Jan. 10 to March 9.

DR. W. T. PHILLIPY, Carlisle, Cumberland County, Pa.

Jan.	3,.....	Dimock,	Susquehanna.
Jan.	4-5,.....	Harford,	Susquehanna.
Jan.	6,.....	Clifford,	Susquehanna.
Jan.	7-8,.....	Thompson,	Susquehanna.

F. S. PUTNEY, State College, Centre County, Pa.

Nov.	19-20,.....	Blue Ball,	Lancaster.
Nov.	22-23,.....	Lampeter,	Lancaster.
Nov.	26-27,.....	Paradise,	Lancaster.

ROBT. S. SEEDS, Birmingham, Huntingdon County, Pa.

	Date.	Place.	County.
Dec.	13-14,.....	Jefferson,	Greene.
Dec.	15-16,.....	Mt. Pleasant Church, .	Greene.
Dec.	17-18,.....	Scottdale,	Westmoreland.
Dec.	20,.....	Irwin,	Westmoreland.
Dec.	21-22,.....	Greensburg,	Westmoreland.
Dec.	23,.....	Latrobe,	Westmoreland.
Jan.	3-4,.....	Moravia,	Lawrence.
Jan.	5-6,.....	Plaingrove,	Lawrence.
Jan.	7-8,.....	Pulaski,	Lawrence.

RAYMOND S. SMITH, State College, Centre County, Pa.

Jan.	3-4,.....	Schaefferstown,	Lebanon.
Jan.	5-6,.....	Annvile,	Lebanon.
Jan.	7-8,.....	Jonestown,	Lebanon.

W. H. STOUT, Pinegrove, Schuylkill County, Pa.

Feb.	29,.....	Friedens Church,	Lycoming.
March	1-2,.....	Montgomery,	Lycoming.
March	3-4,.....	Hughesville,	Lycoming.

VERN T. STRUBLE, Athens, Bradford County, Pa.

Nov.	24-25,.....	Big Creek,	Carbon.
Nov.	26-27,.....	Mahoning,	Carbon.
Nov.	29-30,.....	Weatherly,	Carbon.
Dec.	1-2,.....	Daleville,	Lackawanna.
Dec.	3-4,.....	Tompkinsville,	Lackawanna.
Dec.	6-7,.....	Bald Mount,	Lackawanna.
Dec.	13-14,.....	Hobbie,	Luzerne.
Dec.	15-16,.....	Bloomingdale,	Luzerne.
Dec.	17-18,.....	Dallas,	Luzerne.
Dec.	20-21,.....	Tunkhannock,	Wyoming.
Dec.	22-23,.....	East Lemon,	Wyoming.
Feb.	28-29,.....	White Deer Church,...	Northumberland.
March	1-2,.....	Rebuck,	Northumberland.
March	3-4,.....	McEwensville,	Northumberland.
March	6,.....	Elysburg,	Northumberland.

PROF. W. H. TOMHAVE, State College, Centre County, Pa.

Jan.	13,.....	Mercer,	Mercer.
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R. O. UMHOLTZ, Sacramento, Schuylkill County, Pa.

	Date.	Place.	County
Jan.	3-4,.....	Benshoff Church,	Cambria.
Jan.	5,.....	Boswell,	Somerset.
Jan.	6,.....	Stoyestown,	Somerset.
Jan.	7-8,.....	Somerset,	Somerset.
Jan.	10-11,.....	Berlin,	Somerset.
Jan.	12-13,.....	Cessna,	Bedford.

LEON OTICE VAN NOY, Troy, R. D. No. 66, Bradford County, Pa.

Jan.	10,.....	Orson,	Wayne.
Jan.	11-12,.....	Pleasant Mt.,	Wayne.
Jan.	13,.....	Aldenville,	Wayne.
Jan.	14-15,.....	Honesdale,	Wayne.
Jan.	17-18,.....	Greentown,	Pike
Jan.	19-20,.....	Paupack,	Pike
Jan.	21-22,.....	Egypt Mills,	Pike
Jan. 31-Feb. 1,.....	Springtown,	Bucks.	
Feb.	2-3,.....	Sellersville,	Bucks.
Feb.	4,.....	Bristol,	Bucks.
Feb.	5,.....	New Hope,	Bucks.
Feb.	7-8,.....	Newtown,	Bucks.
Feb.	9,.....	Plymouth Meeting,	Montgomery.
Feb.	10-11,.....	Worcester,	Montgomery.
Feb.	12,.....	Harleysville,	Montgomery.
Feb.	14-15,.....	Trappe,	Montgomery.
Feb.	16-17,.....	East Greenville,	Montgomery.
Feb.	18-19,.....	Village Green,	Delaware.
Feb.	21 22,.....	Williamson School. ...	Delaware.
Feb.	23-24,.....	Philadelphia,	Philadelphia.

D. H. WATTS, Kerrmoor, Clearfield County, Pa.

Will attend all meetings in the SECOND SECTION.

JNO. W. WHITE, State College, Centre County, Pa.

Feb.	21-22,.....	Middleburg,	Snyder.
Feb.	23-24,.....	Mt. Pleasant Mills, ...	Snyder.
Feb.	25-26,.....	Hartleton,	Union.

W. R. WHITE, State College, Centre County, Pa.

Dec.	1-2,.....	Daleville,	Lackawanna.
Dec.	3-4,.....	Tompkinsville,	Lackawanna.
Dec.	6-7,.....	Bald Mount,	Lackawanna.

W. THEO. WITTMAN, Allentown, Lehigh County, Pa.

Will attend all meetings in the **SECOND SECTION** from Dec. 1 to 23; Jan. 14 to March 6, and Movable Institute Schools Jan. 4-5 Jerseytown, Jan. 6 Numidia, Jan. 7-8 Mausdale, Jan. 10-11 Salix.

E. L. WORTHEN, State College, Centre County, Pa.

	Date.	Place.	County.
Dec.	13-14,.....	Jefferson,	Greene.
Dec.	15-16,.....	Mt. Pleasant Church,..	Greene.
Dec.	17-18,.....	Scottsdale,	Westmoreland.

PAUL I. WRIGLEY, Eddington, Bucks County, Pa.

Dec.	13-14,.....	Arendtsville,	Adams.
Dec.	15-16,.....	Fairfield,	Adams.
Dec.	17-18,.....	New Oxford,	Adams.
Dec.	20-21,.....	Ickesburg,	Perry.
Dec.	22-23,.....	Greenpark,	Perry.

R. J. WELD, Sugargrove, Warren County, Pa.

Jan.	6,.....	Jerseytown,	Columbia.
Jan.	7-8,.....	Numidia,	Columbia.
Jan.	10-11,.....	Mausdale,	Montour.
Jan.	12-13,.....	Salix,	Cambria.
Jan.	17-18,.....	Pleasant Corner,	Lehigh.
Jan.	19-20,.....	Seipstown,	Lehigh.
Jan.	21-22,.....	Macungie,	Lehigh.
Feb.	7-8,.....	Cross Roads,	York.
Feb.	9-10,.....	Stewartstown,	York.
Feb.	11-12,.....	New Freedom,	York.

GENERAL LIST OF INSTITUTE LECTURERS WITH THEIR SUBJECTS.

Season 1915-1916.

ANDERSON, H. M., New Park, Pa.

1. Corn Culture.
2. Alfalfa and Other Legumes.
3. Control of Soil Moisture.
4. Home Mixing of Fertilizers.
5. Potato Culture.
6. Orchard Management.
7. Silage and the Soil. (30-40 minutes each).

BARNITZ, C. M., Riverside, Pa.

1. Mother Hen; Her Brood and Their Care. (Illustrated with slides).
2. Artificial Incubation and Brooding. (Illustrated with slides).
3. The Chick from Shell to Maturity. (Illustrated with slides).
4. Turkey Raising; How to Succeed. (Illustrated with slides).
5. The Evolution of the Rooster. (Illustrated with slides).
6. Feeding for Winter Eggs. (Illustrated with slides).
7. Poultry Diseases; Their Prevention and Cure. (Illustrated with slides).
8. Poultry Parasites; Their Description and Destruction. (Illustrated with slides).
9. Best Farm Breeds and Their Needs.
10. The Modern Poultry House. (Illustrated with slides).
11. Finishing and Dressing Poultry.
12. The Farm Boy's Welfare. (Evening).

Note—Most of these topics are illustrated with slides and County Chairmen should notify when slides are desired.

BECHDEL, S. I., State College, Pa.

1. Silo and Silage. (Illustrated with slides). (40-50 minutes).
2. Feeding the Dairy Calf. (30-50 minutes).
3. Clean Milk Production.
4. Feeding the Dairy Cow.
5. Farm Butter Making. (30-50 minutes each).

BENNINGER, W. II., Benningers, Pa.

1. Specialties on the Farm.
2. Profit in Breeding Pure Bred Dairy Cattle.
3. Poultry Selection and Care of a Dairy Herd.
4. Poultry on the Farm.
5. Reasons of the High Cost of Living.
6. Butter Making on the Farm.
7. How to Make Good Roads in a Business Way.

BOND, M. S., Danville, Pa.

1. Some Things Wrong with the Institute.
2. Use and Results of Commercial Fertilizers.
3. Where and When I Use Lime.
4. What Farmers' Institutes were 30 Years Ago.
5. Points in Market Gardening.
6. Potato Culture. (20-30 minutes each).

BULKLEY, GEO. S., State College, Pa.

1. Feeding the Dairy Cow.
2. Selecting Grain Mixtures for Dairy Cows.
3. Raising the Dairy Calf.
4. The Dairy Heifer.
5. The Dairy Sire.
6. The Value of the Advanced Registry Test of Dairy Cows.

CAMPBELL, J. T., Hartstown, Pa.

1. Work of Farmers' Institutes. (Opening of Institute). (15 minutes).
2. Poultry, Feeding for Egg Production. (25 minutes).
3. Poultry, Parasites and Diseases. (25 minutes).
4. Poultry, Care and Feeding of Chicks. (25 minutes).
5. Problems of the Large Poultry Farm. (30 minutes).
6. Economic Maintenance of Productive Power of Soil. (45 minutes).

7. Tillage in Relation to Soil Fertility. (30 minutes).
8. The Practice of Tile Drainage. (30 minutes).
9. How Nature Makes Soil. (Illustrated with slides). (40 minutes).
10. The Story of Woodbine Farm. (Illustrated with slides). (40 minutes).
11. Home and Community Improvement. (40 minutes).
12. The Farm of Life. (Evening Lecture). (40 minutes).
13. The Summit Road. (Evening Lecture). (60 minutes).

CARD, FRED W., Sylvania, Pa.

1. Soil Management.
 - (a) The Soil Laboratory.
 - (b) A Farm Fertilizer Factory.
2. Farm Management.
 - (a) Business Organization.
 - (b) Records and Accounts.
3. Fruit Growing.
 - (a) Producing the Tree and the Crop.
 - (b) Business Problems Involved.
 - (c) Bush-fruits and Strawberries.
4. Picture Planting on the Lawn. (Illustrated).
5. The Pig in the Poke, Pasture and Parlor.
6. Some Farm Mistakes we are Prone to Make.
7. The Dairy as a Foundation for the Farm Enterprise.
8. The Call of the Land.
9. Some Things Outside the Farmyard Gate.
10. Some Lessons at School. (30-45 minutes each).

CONARD, DR. M. E., Westgrove, Pa.

1. Selecting and Raising the Calf to Improve the Dairy Herd.
2. Cow Stable Construction; Sanitary and Comfortable.
3. Essential Points in the Production of Wholesome Milk.
4. Selecting and Breeding Horses for Farm and Market.
5. Comparative Types and Characteristics of the Dairy Breeds. (Illustrated with slides).
6. The Modern Dairy Equipment and Methods. (Illustrated with slides).
7. Concrete Construction for the Farm. (Illustrated with slides).
8. The Silo, Its Construction and Management.
9. The Babcock Milk Tester. (Demonstrated). (For Movable School only). (30-60 minutes each).

COOKE, PROF. WELLS W., U. S. Department of Agriculture, Washington, D. C.

1. Economical Feeding of Farm Stock.
2. The Restoration and Preservation of a Worn Out Soil.
3. Testing Milk and Its Products. (Illustrated with slides).
4. Alfalfa Growing in Pennsylvania.
5. The Most Profitable Use of the Silo.
6. The Effect of Feed on the Quantity or Quality of the Milk.
7. Commercial Fertilizers; Their Purchase and Use.
8. The Relation of Birds to Agriculture. (Illustrated with slides).
9. The Economical Feeding of the Farmers' Family. (40-50 minutes each).

DARST, W. H., State College, Pa.

1. Alfalfa.
2. Potatoes.
3. Soy Beans and Cowpeas.
4. Corn Improvement.
5. Soiling Crops.
6. Wheat Improvement.
7. Insects Injurious to Grain Crops.
8. Fungus Diseases of Farm Crops and How to Control Them.
9. Some Troublesome Weeds and Their Control.
10. The Corn Score Card and Methods of Judging. (30-40 minutes each).

DORSETT, E. B., Mansfield, Pa.

1. Building up the Dairy Herd.
2. The Feed and Care of the Dairy Cow.
3. The Silo as a Factor in Dairying.
4. Care and Use of Stable Manure.
5. Consolidation of Schools. (Illustrated with slides),.
6. Organization of Farmers.
7. Co-operation for Farmers.
8. Good Roads; How to Build and Maintain Them. (Illustrated with slides).
9. Commercial Fertilizer and How to Use It.
10. America's Uncrowned Queen. (Evening). (40-45 minutes each).

FASSETT, F. H., Meshoppen, Pa.

1. Care of the Orchard. (40 minutes).
2. Starting the Orchard. (40 minutes).
3. Pruning. (30 minutes).
4. Spraying; How and When.
5. Orchard Insects. (Illustrated with slides). (30 minutes).
6. Strawberries. (30 minutes).
7. Birds; Their Importance to the Farm. (Illustrated). (40 minutes).
8. Peaches; Planting and Care. (40 minutes).

FAUST, S. L., Hoboken, Pa.

1. Poultry on the General Farm. (30 minutes).
2. Potato Growing. (25 minutes).
3. Determining the Need of Fertilizers. (35 minutes).
4. Alfalfa for the General Farmer. (35 minutes).
5. Concrete on the Farm. (25 minutes).
6. A New Education for Our Boys and Girls. (Educational). (30 minutes).

FERGUSON, J. A., State College, Pa.

1. Woodlot Management.
2. How to Start a Woodlot.
3. How to Care for a Farm Woodlot.
4. How to Make Fence Posts Durable.

FUNK, SHELDON W., State College, Pa.

1. Profitable Apple Culture.
2. The Peach; How to Raise It.
3. The Spraying of Fruit Trees.
4. The Growing of Small Fruits.
5. Potato Culture.
6. Home and Market Gardening.
7. Commercial Fertilizers and The Value of Home Mixing.
8. Flowers and Their Care for the Home Lawn. (Afternoon lecture).
9. General Orcharding in Pennsylvania. (Illustrated with slides).
10. An Appeal to our Farmer Boys. (Evening lecture). (36-60 minutes each).

GEORGE, S. C., West Lebanon, Pa.

1. Some Farm Problems; How to Solve Them. (30 minutes).
2. Care and Management of the Farm Team. (20-30 minutes).
3. Dairying in General Farm Work. (20-30 minutes).
4. Our Country Homes. (Evening lecture) (30 minutes).
5. Rural Schools; Some Comparisons. (Evening lecture). (30 minutes).

GERLAUGH, PAUL, State College, Pa.

1. Fattening Steers in Pennsylvania.
2. The Beef Breeding Herd.
3. Breeding and Feeding Horses.
4. The Farmer's Meat Supply.
5. Profitable Pork Production.
6. Silage as a Farm Feed.
7. Sheep Raising on the Pennsylvania Farm.

GILLINGHAM, GEO. L., Moorestown, N. J.

1. The Dairy Calf; Selection, Raising and Training for Life Work. (40 minutes).
2. Farm Poultry; Production of Winter Eggs. (50-60 minutes).
3. Pork Production or Breeding and Management of Swine. (40 minutes).
4. Economical Production of Hay. (30-40 minutes).

GIVEN, G. C., State College, Pa.

1. Lime.
2. Fertilizers; Home Mixture.
3. Bacteria in the Dairy.
4. Bacteria and Their Functions.
5. The Wonders of Modern Chemistry. (25-30 minutes each).

GOODERHAM, H. M., Patton, Pa.

1. Barn Manures; Their Waste and Treatment. (30-45 minutes).
2. Agriculture and our Rural Schools. (25-35 minutes).
3. Butter Making on the Farm. (35-45 minutes).
4. Growing Alfalfa. (35-40 minutes).
5. Marketing of Farm Products. (30-40 minutes).
6. The Boys and the Girls. (Evening lecture). (40-50 minutes).

GOODLING, C. L., State College, Pa.

1. Dairying for Profit. (35 minutes).
2. Growing Alfalfa. (25 minutes).
3. Growing Potatoes. (30 minutes).
4. Growing Corn. (25 minutes).
5. Fertilizing Farm Crops. (30 minutes).
6. The Use of Lime on Land. (30 minutes).

GROUPE, J. STUART, Jersey Shore, Pa., R. D. No. 4.

1. Handling Stable Manure for Best Returns.
2. Nineteen years Experience with Hogs.
3. Some Benefits received from Clover.
4. Humus the Foundation of Soil Fertility.
5. Corn Breeding and Culture.
6. Potatoes; How I grow Them at a Profit.
7. Some Advantages of the Farm over City Life. (Evening lecture). (30-40 minutes each).

GULDIN, PAUL R., Yellowhouse, Pa.

1. Hatching and Rearing Chicks. (30-40 minutes).
2. Winter Eggs; How to Get Them. (30-40 minutes).
3. Poultry for the General Farmer. (30 minutes).
4. The Business Side of Poultry Keeping. (30 minutes).
5. How to Feed the Laying Hen. (30-40 minutes).
6. The New Country Life. (30 minutes).
7. The Rural School: Its Problems and Its Future. (30 minutes).

HERMAN, J. A. Fombell, Pa.

1. Alfalfa is King.
2. Conservation of Moisture.
3. Soil Management.
4. The Proper Use of Fertilizer.
5. How to Keep the Boys and Girls on the Farm.
6. Organization and Co-operation.
7. How to Raise a Large Crop of Potatoes.
8. Fundamentals in Dairying.
9. The Imperative Need of Agriculture in the Public Schools. (30-40 minutes each).

HERR, JOHN D., Lancaster, Pa.

1. Commercial Apple Growing.
2. Commercial Peach Growing.
3. Injurious Insects and Diseases of the Orchard.

4. Injurious Insects and Diseases of Garden, Truck and Field Crops.
5. Soil Fertility.
6. Insecticides. Fungicides and Weed Killers.
7. Co-operative Buying and Selling.
8. Beautifying the Home Grounds.

HULSART, C. C., Matawan, N. J.

1. Asparagus Culture.
2. Early Tomato Culture.
3. Cantaloupe Culture.
4. Corn Culture.
5. Humus and Cover Crops.
6. Home Mixed vs. Commercial Fertilizers.
7. Insect Pests and Their Control.
8. Small Fruits, Strawberries and Raspberries.
9. Plant Breeding and Seed Saving by the Farmer.
10. Truck Farming; The Man, The Business and the Crop.
11. Our Education. (40-50 minutes each).

HULL, GEO. E., Sharpsville, Pa.

1. Making the Dairy Pay. (25 minutes).
2. Feeding Beef Cattle. (20 minutes).
3. Growing and Handling a Food Hay Crop. (20 minutes).
4. Getting Along on the Farm. (25 minutes).
5. Our Country Homes. (30 minutes).

LIGHTY, L. W., East Berlin, Pa., R. D.

1. The Business of Dairy Production. (30-60 minutes).
2. The Business of Marketing Dairy Products. (30-60 minutes).
3. Corn Growing. (30-45 minutes).
4. Silo, Soiling and Pasture. (30 60 minutes).
5. Maintaining and Improving Soil Fertility. (30-60 minutes).

LYONS, HANNAH McK., Lincoln University, Pa.

1. Science in Home Making.
2. Our Home.
3. Health in the Home.
4. Helpers We May Have.
5. What Shall We Eat.
6. Little Things.
7. Efficiency in Home Making. (30-40 minutes each).

MAIRS, PROF. THOS. I., State College, Pa.

1. Live Stock and Soil Fertility. (30 minutes).
2. What is a Balanced Ration? (30-40 minutes).
3. School Training for Farm Life. (30 40 minutes).
4. Consolidation of Country Schools. (20-30 minutes).
5. Rural Sanitation and Hygiene. (20-30 minutes).

McCALLUM, M. H., Wernersville, Pa.

1. Forms and Use of Lime.
2. Alfalfa.
3. Legumes; Their Relation to Crop Production.
4. Buying and Home Mixing Fertilizers.
6. Essentials of Success with Potatoes.
7. Farm Management.
8. Things Worth While on the Farm. (Evening). (25-35 minutes each).

McCURDY, C. C., Hartstown, Pa.

1. Profitable Poultry on the Farm. (40 minutes).
2. Hatching and Raising Little Chicks. (45 minutes).
3. Poultry Houses and Fixtures. (30 minutes).
4. Commercial Potato Growing. (30 minutes).
5. Bringing up the Soil. (40 minutes).

MENGES, PROF. FRANKLIN, York, Pa.

1. Natural Ways and Maintaining the Fertility of the Soil. (40 minutes).
2. Soil Moisture and Humus. (30 minutes).
3. Nitrogen Fixation. (30 minutes).
4. Ways of Introducing Clovers into Rotations. (30 minutes).
5. Corn Breeding.
6. Selection of Seed Wheat and Wheat Raising. (30 minutes).
7. Industrial Alcohol in Agriculture. (30 minutes).
8. Necessity of Education for the Farmer. (35 minutes).
9. Insect Life in Agriculture. (30 minutes).
10. Domestic Chemistry in the Country Schools. (30 minutes).
11. Community Interests. (30 minutes).

MITMAN, HOWARD, Hellertown, Pa.

1. Poultry Feeds and Feeding.
2. Keeping the Flock Well.
3. Hatching and Feeding Chicks.
4. Poultry Buildings and Grounds.

5. Handling and Selling Eggs and Poultry.
6. Raising Poultry Feed; How and What.
7. Incubators and Brooders.
8. Tillage; Preparation and Cultivation of the Soil.
9. Books and Periodicals; How to Choose Them; How to Use Them.
10. Essentials of a Country Home.
11. Keeping Farm Accounts.
12. Concrete on the Farm. (Illustrated with slides). (30 minutes each).

MYERS, C. E., State College, Pa.

1. Experiments with Vegetables. (Illustrated with slides).
2. Market Gardening.
3. Some Fundamental of Soil Management.
4. Potato Culture.
5. Principles and Practices of Plant Breeding. (Illustrated with slides). (35-45 minutes each).

NOLL, CHAS. F., State College, Pa.

1. Potatoes.
2. Alfalfa.
3. The Care of Pastures.
4. Principles and Methods in Plant Breeding. (Illustrated).
5. Conservation of Soil Moisture.
6. Care and Use of Farm Manures. (30-45 minutes each).

ORTON, C. R., State College, Pa.

1. Potato Diseases and Their Control.
2. Fire-blight of Fruit Trees.
3. Fruit Diseases.
4. Tree Diseases. (50-60 minutes each, illustrated with slides).

PATTON, WM. M., Mosgrove, Pa.

1. Planting and Care of Farm Orchard.
2. Lime; How, When and For What to Use It.
3. The Possibilities for Alfalfa and How to Grow It.
4. Potato Growing for Profit. (On small scale).
5. Clover Growing as a Soil Renovator.
6. Marketing the Products of the Farm.
7. Caring for the Soil.
8. The Little Red School-house as I Knew It. (30-40 minutes each).

PHILIPS, T. J., Atglen, Pa.

1. Poultry Houses.
2. My Hens are Worth \$3.00 Each—Are Yours?
3. Commercial Fertilizer; What to Use.
4. Stable Manure; Its Best Use.
5. Economical Dairy Feeding.
6. Lime; How and When to Use It.

PHILLIPS, E. L., New Bethlehem, Pa., R. D. No. 2.

1. Poultry Farming.
 - (a) Selection of Breeds.
 - (b) Incubation and Brooding.
 - (c) Feeding.
2. Poultry (Illustrated by slides). (50-60 minutes).
 - (a) Growing the Fowls.
 - (b) Houses.
 - (c) Marketing.
3. Poultry Houses; Location, Construction and Care. (25 minutes).
4. The Need of Lime in the Soil. (30 minutes).
5. How to Buy Commercial Fertilizers and How to Use Them. (35 minutes).

PHILLIPY, W. T., Carlisle, Pa.

1. Soils and Their Management.
2. Increasing Soil Fertility.
3. Legumes and Their Importance.
4. Practical Dairying.
5. Alfalfa Growing.
6. Corn Selection and Culture.
7. Lime and Its Use.
8. Potato Growing.
9. The Old Farm. (Evening lecture).
10. The Most Important Duty of our People. (Evening lecture). (40 minutes each).

PUTNEY, F. S., State College, Pa.

1. Breeding Dairy Cattle.
2. Feeding Dairy Cattle.
3. Management of Dairy Herd.
4. Raising the Dairy Calf.
5. The Dairy Heifer.

ROW, CHAS. A. Yardley, Pa.

1. Growing and Selecting Corn. (30-40 minutes).
2. Building up the Dairy Herd. (30-40 minutes).
3. Feeding Dairy Cattle. (30-40 minutes).
4. Home Mixing Fertilizers. (30-40 minutes).
5. Increasing Soil Fertility. (30-40 minutes).
6. Agricultural Education. (30-40 minutes).
7. Agricultural Fairs. (20-25 minutes).
8. Eradication of Weeds. (20-25 minutes).

SEEDS, ROBT. S., Birmingham, Pa.

1. Value of Barnyard Manure. (30 minutes).
2. The Value of Fertility and the Cheapest Way to Get It.
4. Education and the Farmer. (20 minutes).
5. Benefits Derived from Farmers' Institutes. (20 minutes).
6. What Constitutes a Country Home. (45 minutes).
7. Mistakes of Life Exposed. (60 minutes).

SMITH, RAYMOND S., State College, Pa.

1. Crop Rotation. (30 minutes).
2. Farm Drainage. (30 minutes).
3. Functions and Control of Soil Moisture. (35 minutes).
4. The State Soil Survey and Its Value. (25 minutes).
5. Relation of the Farmer to his Soil. (Evening lecture). (45 minutes).
6. Rational Fertilizer Practice. (30 minutes).

STOUT, W. H., Pinegrove, Pa.

1. Manures and Fertilizers.
2. Tile Drainage.
3. Maintaining Fertility.
4. Fruit Growing.
5. Potato Culture.
6. Bee-Keeping.
7. Geological Observations.
8. The Origin of Soils. (30 minutes each).

STRUBLE, VERN T., Athens. Pa.

1. The Young Orchard.
2. Care and Profits of an Old Orchard.
3. Orchard Pests and Their Treatment.
4. Picking and Handling the Fruit Crop.

5. Making our Dairy Pay.
6. Dairy By-products and Their Use.
7. Farm Problems and Attractions. (Evening lecture). (35-40 minutes each).

TOMHAVE, PROF. W. H., State College, Pa.

1. Fattening Steers in Pennsylvania.
2. The Beef Breeding Herd.
3. Profitable Pork Production.
4. Breeding and Feeding Horses.
5. Sheep Raising on the Pennsylvania Farm.
6. The Farmer's Meat Supply.
7. Silage as a Farm Feed. (25-30 minutes each).

UMHOLTZ, R. O., Sacramento, Pa.

1. Progressive Poultry Farming of Commercial Poultry Farm.
2. The Farmer and the Farm Flock or Possibilities of Poultry on the Farm.
3. Some Reasons Why We Have Poultry Failures or Mistakes in Chicken Farming.
4. Getting the Egg or Caring for the Layers.
5. Getting the Chick or Hatching the Eggs.
6. Getting the Layer or Raising the Chick.
7. Echoes from the Show Room or Exhibiting and Judging Chickens.
8. The Scrub; The Utility-Bred and the Fancy Chickens.
9. Round Table Poultry Talks on Live Subjects. (40-50 minutes each).

VAN NOY, LEON OTICE, Troy, Pa.

1. How to Lay a Foundation for the Dairy Herd.
2. Feed and Care of the Dairy.
3. Making Butter on the Farm.
4. The Silo.
5. Swine as a Side-line with Dairying.
6. Soil Fertility.
7. Experience with Milking Machines.
8. Pertinent Points of Dairying. (Illustrated).
9. Farming vs. Other Occupations. (Evening lecture).
10. The Care of Milk.
11. Things Worth While. (Evening lecture).
12. Experience with Farm Tractors. (25-45 minutes each).

WATTS, D. H., Kerrmoor, Pa.

1. Apple and Peach Culture. (Illustrated with slides). (30-40 minutes).
 - (a) Starting an Orchard. (30 minutes).
 - (b) Orchard Tillage. (20 minutes).
 - (c) Fertilizing the Orchard. (20 minutes).
 - (d) Tree Diseases, Insects and Spraying. (20 minutes).
2. Building up the Dairy Herd for Profit. (30 minutes).
3. Economic Feeding of the Herd.
4. Alfalfa; Its Value and Culture. (30 minutes).
5. How to Make and Sell Gilt-Edge Butter. (30 minutes).
6. The Farmer and Good Roads. (30 minutes).
7. The Soil and Plant Growth. (30 minutes).
8. Farm Buildings and Blunders. (Evening lecture). (40 minutes).
9. Our Education. (Evening lecture). (40 minutes).

WELD, R. J., Sugargrove, Pa.

1. The Selection of Cows for the Dairy Herd.
2. The Breeding of the Dairy Herd.
3. The Feeding of the Dairy Herd.
4. Herd Records Necessary to Improving.
5. The Dairy Stocks.
6. The Babcock Test.
7. The Value of Membership in a Cow Testing Association.
8. The Organization of a Cow Testing Association. (40-50 minutes each).

WHITE, JOHN W., State College, Pa.

1. Phosphate Fertilizers.
2. Meaning of Soil Analysis.
3. Relative Value of Lime in Different Forms.
4. Soil Acidity.
5. Green Manures.
6. Functions of Lime and Magnesia. (30 minutes).

WHITE, W. R., State College, Pa.

1. Strawberries.
2. Fruit Growing.
3. Pruning.
4. The Use of Concrete on the Farm.
5. Farm Architecture. (Illustrated with slides).
6. The Central Township High-school. (30-40 minutes).

WILLIAMS, A. E., Cochran, Pa.

1. General Physics of the Soil.
2. Chemistry of Lime and Its Effect on the Soil.
3. Commercial Fertilizers and Plant Growth.
4. Pure Bred Stock and Registration.
5. Pure Rural School made Efficient. (60 minutes each).

WITTMAN W. THEO., Allentown, Pa.

1. The Farm Poultry and How to Handle It.
2. Increasing the Winter Yield of Eggs.
3. Poultry Houses and Correct Principles of Construction.
4. Pennsylvania Poultry Houses; Good and Bad. (Illustrated with slides).
5. The Value and Possibilities of Breeding in Poultry.
6. Popular Varieties of Poultry, Fancy and Utility. (Illustrated with slides).
7. Specific Directions; How and What to Feed Poultry to get Results.
8. Correct Methods of Handling and Feeding Growing Chickens.

WORTH, E. L., State College, Pa.

1. Profitable Fertilization of the Corn Crop. (40 minutes).
2. Crop Rotation for Pennsylvania. (30 minutes).
3. How to Secure the Greatest Profit from Manure. (30 minutes).
4. Fertilizing the Home Garden. (30 minutes).
5. The Essentials for Success with Alfalfa. (40 minutes).
6. Lime and Liming. (40 minutes).
7. Where and How to Purchase Fertilizers. (30 minutes).
8. The Farmers' Modern "Gold Bricks." (40 minutes).

WRIGLEY, PAUL I., Eddington, Pa.

1. Organic Matter and Soil Fertility.
2. Farm Management.
3. Hay, Growing and Harvesting.
4. Asparagus Culture.
5. The Use of Lime.
6. Commercial Fertilizers.
7. Feeding Farm Animals.
8. Human Foods; Their Uses.
9. The Care of Milk. (Illustrated). (25-40 minutes each).

LIST OF SPECIAL INSTITUTE INSTRUCTORS

W. H. Benninger, Benningers, Pa.
 Prof. J. A. Ferguson, State College, Pa.
 Paul Gerlaugh, State College, Pa.
 G. C. Given, State College, Pa.
 C. L. Goodling, State College, Pa.
 Dr. H. H. Hayner, State College, Pa.
 Prof. M. G. Kains, State College, Pa.
 Howard Mitman, Hellertown, Pa.
 Chas. A. Row, Yardley, Pa.
 Prof. B. O. Severson, State College, Pa.
 Vern T. Struble, Athens, Pa.
 Prof. W. H. Tomhave, State College, Pa.
 R. O. Umholtz, Sacramento, Pa.
 Leon Otice Van Noy, Troy, Pa.
 A. E. Williams, Cochran, Pa.
 Paul I. Wrigley, Eddington, Pa.
 S. L. Faust, Hoboken, Pa.

DEPARTMENT LECTURERS

In so far as time and circumstances will permit, the officers of the Department of Agriculture are desirous of engaging in Institute work.

In order to prevent disappointment in the arrangement of programs, it is recommended that Institute Managers first consult the individual whose services they may wish to secure, before placing his name on the program.

Department lecturers come to these Institutes free of charge, except that they are to be taken from and to the railroad station at the expense of local managers. The topics which they will discuss can be procured by addressing the following officers of the Department of Agriculture:

HON. N. B. CRITCHFIELD, Secretary of Agriculture.
 HON. A. L. MARTIN, Deputy Secretary and Director of Institutes
 JAMES FOUST, Dairy and Food Commissioner.
 PROF. H. A. SURFACE, Economic Zoologist.
 DR. C. J. MARSHALL, State Veterinarian.

BIOGRAPHICAL SKETCHES OF THE INSTITUTE LECTURERS

H. M. ANDERSON was born August 26th, 1874, on the farm which he has recently purchased from his father. He graduated from the York Collegiate Institute in 1894, since which time he has devoted practically all his time to agriculture. Has been for quite a number of years growing very profitable farm crops in what has until very recent years been called the York County Barrens. He is particularly interested in growing alfalfa, potatoes and corn and is doing experimental work with these crops; has an apple orchard of which he is very proud and is a close student of modern methods of increasing soil fertility.

S. I. BECHDEL was born and raised on a general farm near Howard, Centre County, Pennsylvania. Taught in the public school of Blair and Centre Counties. Entered the School of Agriculture of the Pennsylvania State College in 1907, from which he was graduated in 1911. Served as Dairy Extension Agent for the U. S. Dairy Division from September, 1911, to May, 1913, in the State of Alabama. Was then transferred to the Office of Dairy Farming Investigations, Bureau of Animal Industry, Washington, D. C. He resigned from this position in December, 1913, to take up his present duties as Instructor in Dairy Husbandry in the Pennsylvania State College.

M. S. BOND was born on a farm in Montour county, Pa., February 26, 1834; lived and worked on a farm until eighteen years old, then taught school seven years, then was employed as a freight and passenger conductor for nine years and traveled as lost freight and car tracer and purchasing agent for the Delaware, Lackawanna and Western Railroad Company for five years. Has been for over twenty-five years engaged in farming and market gardening; during a part of this time, engaged in breeding and raising blooded Jersey cattle and still keeps some of the best in the State; has made the raising of potatoes by the thousands of bushels a specialty for twenty-five years; has been and is now using more fertilizer to the acre than any man in his county, and is now making gardening a specialty.

CHARLES M. BARNITZ began the study of poultry culture twenty-five years ago and now conducts a model up-to-date poultry plant at Riverside, Pa., and is a recognized authority on poultry. His success and expert articles in the poultry press of the United States and Europe attracted the American Press Association, the greatest newspaper syndicate in the world. He accepted a place on their staff as editor and artist of their poultry feature, and his poultry writings are now read by millions of people throughout the United States. His modern and extensive plant at Riverside is a practical and profitable one and interesting experiments with land and water fowl afford much valuable data for platform and press.

GEORGE S. BULKLEY was born and raised on a dairy farm in Lake County, Illinois; attended public school and High School at Libertyville, Illinois. He next attended Northwestern University at Evanston, a year. Was clerk in office of Sheldon School, Chicago, Illinois. Worked on dairy farm. Attended the University of Wisconsin, graduating from the College of Agriculture. After graduation he came to The Pennsylvania State College to take his present position as Instructor in Dairy Husbandry, assisting in experimental work in milk production and having charge of the official testing of dairy cows for Advanced Registry.

FRED W. CARD was born at Sylvania, Pa., in 1863. Attended the common schools and the Mansfield State Normal, from which he graduated in 1880. He taught three years in the public schools and took a business college course, after which he spent five years in gardening and small-fruit growing. In the fall of 1889 he entered Cornell University and completed the regular course in agriculture in 1892. He was then granted a fellowship and remained for graduate work the following year, receiving his master's degree in 1893. He was appointed assistant in horticulture at the Cornell University experiment station, but resigned in a short time to become associate professor of horticulture at the University of Nebraska, remaining in this position for five years. In 1898 he became professor

of horticulture at the Rhode Island College of Agriculture and Mechanic Arts, and in 1901 professor of agriculture as well. This position he resigned in 1897 to engage in actual farming on the farm where he was born, which he had purchased while in Nebraska.

J. T. CAMPBELL was born in Springfield township, Fayette county, Pa., December 18, 1872; is the son of a prominent farmer; received his early education in the public schools of his native district; left the public schools with a more than average education and at once took up the study of agriculture at home, while working on his father's farm; he studied carefully all leading books and journals of his day. Married in 1894, and took up gardening and poultry culture, and was successful from the start. When the Pennsylvania State College started its correspondence courses in agriculture he took up the work and has since pursued same with diligence. Owns a large farm in Crawford county, upon which he has worked out many important agricultural problems. In poultry culture he has been exceptionally successful, having made it a subject of special study, together with soil physics. Keeps in close touch with the State Experiment Station and the National Department of Agriculture; has written some for various agricultural and poultry journals.

DR. MILTON E. CONARD was born in southern Chester county, of an ancestry of successful agriculturists. He obtained his education in the public and high schools and Millerville State Normal School. He was for some years engaged in farming in his home locality; later taking the course in veterinary medicine at the University of Pennsylvania, in which institution he was for 16 years lecturer of Dairy and Milk Inspection and Veterinary Obstetrics. Throughout his veterinary career he has been closely identified with dairy interests, practicing for some years in a dairy locality, and having for over ten years given his entire time as Inspector and Consulting Expert for a large number of the dairies furnishing milk to the City of Philadelphia, from Pennsylvania, New Jersey, Maryland and Delaware.

W. H. DARST was born on a farm in Miami county, Ohio, in the year 1884. After completing a high school education he rented a farm and farmed for two and one-half years. He then entered the Agricultural College of the Ohio State University taking the bachelors degree in the year 1910. During the year 1910, and until the fall of 1912 he was employed in the Agricultural Extension Department of the Ohio Agricultural College, as lecturer and demonstrator of Agronomy, more particularly of farm crops. Since September 1912, he has been employed by the School of Agriculture of the Pennsylvania State College as Assistant Professor of Agronomy, farm crops division.

E. B. DORSETT was born on a farm in Richmond township, Tioga county, Pa., February 17, 1868. He received a common school education in the district where he lived, then attended the Mansfield State Normal School, from which he was graduated in 1896. Ten years were spent teaching during the winter months and farming during the summer. With the exception of six years spent in the Sheriff's Office at Wellsboro, he has always lived and worked on the farm. At present, he and his brother, S. C. Dorsett, own and operate a large farm in Mansfield township, making dairying a specialty. His work in the Grange as State Lecturer, has brought him in close touch with the farmers and farm operations throughout the State, and has given him a fund of knowledge that will be useful to him in his work as an institute worker.

F. H. FASSET, Meshoppen, Pa., was born June 3, 1855, in Windham township, Wyoming county, Pa., moved to Meshoppen township in 1869, to the farm where he now resides; was educated in the common schools and took a course in select schools in Meshoppen borough; has been actively engaged in the growing of tree fruits with marked success for the last twenty-five years; all up-to-date methods of orchard treatment, spraying and pruning have been in use; took up the business of growing small fruits for the market some 12 years ago and has met with fair success. Is President of Wyoming County Horticultural Society and in close touch with the fruit interests in this section.

SHELDON W. FUNK was born in Boyertown, Berks County, Pa., and comes from a long line of fruit growers and gardeners. He has a good High School education and also attended Perkiomen Seminary. From childhood he has been brought up among fruit and vegetables, five years having been spent in Florida in the same work.

He is now engaged in greenhouse, fruit and truck business with his father in Boyertown where they are specializing in the growing of fancy fruits and vegetables for a retail and wholesale market.

He is also in the employ of the Pennsylvania Department of Agriculture in the capacity of Farm Advisor on Fruit and Market Gardening, and his services are free to all persons in the State desiring information or help along this line.

J. A. FERGUSON is a native of New York State, from the Lake Region, graduated from Hamilton College, Clinton, N. Y., 1896, engaged in teaching for ten years, graduated in Forestry from Yale University, served in the U. S. Forest Service in Idaho, has been at State College since 1908, except for one and one-half years at the University of Missouri, Columbia, Mo., where he established the Forestry Department and the Forest School, is at present in charge of the work in Forestry at Pennsylvania State College.

G. C. GIVEN was born in Auburn, Maine. Degree of Bachelor of Science in 1906 from the New Mexico State College; Master of Science in 1910 from the Pennsylvania State College; Doctor of Philosophy in 1914 from the University of Goettingen, Germany; 1907-1910, Assistant Chemist at the Pennsylvania State College Agricultural Experiment Station; 1910-1915, Assistant Professor of Experimental Agricultural Chemistry at the Pennsylvania State College; 1915, Associate Professor of Experimental Agricultural Chemistry, Pennsylvania State College.

H. M. GOODERHAM was born and reared on the farm where he now resides and cultivates in Cambria county. He was educated in common schools academy at Carrolltown, Pa., and Ohio Normal University, Ada, Ohio. After teaching in common schools for several terms, he took up farming and experimental work, which he has followed successfully ever since. He has throughout his life been very much interested in education and uplifting of his brother farmer and his family. He has held several public offices of trust and at one time was a member of the State Board of Agriculture and at that time holding the distinction of being the youngest member on the Board in the State. He is at present treasurer of the Cambria County Horticultural Society.

L. W. LIGHTY was born in York county, Pa., 1857; attended the public schools of his neighborhood; afterwards attended a select school in Adams county and then taught school for seven winters. During this time he attended the York County Academy one term and also attended the State Normal School at Millersville. He then kept store, but not liking the business he got out of it and started in the poultry business, keeping both market and fancy poultry, and engaged in bee keeping and the culture of small fruits. In 1893 he purchased the farm upon which he now lives. The land was worn out and the buildings quite dilapidated. He has improved this until it is now one of the best farms in his county. He has a large library of standard books, keeps a selected dairy of cows, and has all the modern improvements needed to equip a first-class farm.

CHAS F. NOLL was born and raised on a farm at Green Park, Perry county, Pennsylvania. His early education was secured in the public schools, the New Bloomfield Academy and the Cumberland Valley State Normal School and from the last he was graduated in 1900. Five years he spent as teacher in the public schools after which he took the Agricultural course in the Pennsylvania State College from which he was graduated in 1906. Then he was field assistant in the Department of Agriculture at Harrisburg for one year, and manager of the Nostrand Fruit Farm on Shelter Island, New York, for one year. In 1908 he went to the Pennsylvania State College to engage in the investigational work which he has followed since then except for one year (1910-11) spent in graduate work at Cornell University. At the Pennsylvania Experiment Station he has charge of the field experiments along agronomic lines, which include investigations with cereals, forage crops, potatoes, plant breeding and liming and fertilizer treatments.

MALCOM H. McCALLUM is a Berks countian by birth, born, however, of Scotch parentage, and "dyed deep in the wool" in truck and fruit raising, his father, James McCallum, being the pioneer celery and fruit grower for the Reading markets. He is in the prime of life. He was educated in the common schools of Berks county, Pa., Butler University, Indianapolis, Indiana, and the University of Pennsylvania, Philadelphia, Pa. In 1904 he was chosen farm and garden superintendent of State Asylum, Wernersville, Pa., which position he now holds.

THOMAS I. MAIRS spent his early life upon a stock farm and graduated from the College of Agriculture of the University of Missouri in 1896. He took graduate work at the Michigan Agricultural College, the University of Illinois, and the University of Missouri. He was superintendent of field experiments at the University of Illinois in 1896-7, and Assistant in Agriculture at the University of Missouri from 1897 to 1901. Since he has been connected with the Pennsylvania State College. He is now Superintendent of Correspondence Courses and Professor of Agricultural Education. He has taught dairy and animal husbandry and has had charge of the experiment work along these lines.

PROF. FRANKLIN MENGES, Ph. D., was born forty-six years ago at Menges Mill, York county, Pa.; the first nineteen years of his life were spent on his father's farm with all the ardour that farming meant in those days; he then began a course of preparation for college at the Baugher Academy, Hanover, Pa., and entered and graduated from Pennsylvania College, Gettysburg, with the class of 1886; was immediately tendered and accepted the position of assistant professor of chemistry in his Alma Mater, which position he held until 1896, when he came to York and took the professorship of the sciences in the York High School, which position he now holds; received the degree of Ph. D. from his Alma Mater for special work in chemistry, mineralogy and physics. He has for years been a student of the "Experiment Station Record," and has continued an interest in practical agriculture and has lectured before Farmers' Institutes.

C. R. ORTON was born April 1, 1885, at East Hardwick Vermont. Lived on a farm until twenty years old when he entered the University of Vermont from which he was graduated in the Agricultural Department, June, 1909. Was Assistant in Plant Pathology at the Vermont Experiment Station until February 1, 1910, when he removed to the University of Wisconsin. Held the position of Assistant Plant Pathologist in the Wisconsin Agricultural Experiment Station until 1911, when he transferred to Purdue University as Assistant Botanist and remained there until January 1, 1913. Came immediately to the Pennsylvania State College where he holds the position of Associate Professor of Botany, and Plant Pathologist in the Experiment Station.

F. S. PUTNEY was born on a dairy farm in New Hampshire. In 1901 he was graduated from the Concord High School and the following year entered the New Hampshire State College from which he graduated in 1905 after which he secured a position on a pure bred Jersey farm and a few months later was appointed Assistant in Animal Husbandry and Agronomy at the Pennsylvania State College from which institution he received his Master's degree in 1908. The following year he received a fellowship at the University of Missouri where he made a special study of breeding as well as dairy cattle judging and stock management. In 1909 he was appointed Assistant to Dean and Director Mumford. After a year he was appointed Professor of Animal Husbandry at the Rhode Island State College which position he held until July 1, 1913, when he returned to the Pennsylvania State College as Assistant Professor of Dairy Husbandry.

E. L. PHILLIPS was born on his father's farm in Clarion county, Pa. Was educated in the common schools and a course in the High School at Reid Institute, Pa. Since then he has studied extensively in agriculture. Was married in 1885, after which he devoted his time to agriculture, owning and operating his 200 acre farm with profit to himself. Said farm is in Clarion county, Pa. He has devoted his farm chiefly to the production of fruits, live stock and grain suitable to that location and market. He has been an experimenter with various plant foods. His real estate holdings and commercial standing are a strong recommendation to himself and to the farm. On his farms known as Valley Hamus, there are from 5,000 to 6,000 fowls kept during each year.

CHARLES A. ROW has lived on a farm all his life and done experimental work along various agricultural lines for the last six years. The two years previous to these were spent in the Ontario Agricultural College at Guelph, Canada, from which institution he received a diploma. He is now in business with his father on a large farm near Yardley. They are making a specialty of raising pure bred cattle and improving corn and wheat by plant selection.

R. S. SEEDS was born in Huntingdon county, Pa., 1852; was educated in the public schools and at the Shade Gap Academy. He was raised upon a farm and traveled for eighteen years among the farmers selling agricultural implements. In 1892 he bought a farm that had been run down, which he has greatly improved.

W. H. STOUT was born October 18, 1840, in Lower Nazareth township, Northampton county, Pa., was educated in the common schools and engaged in various occupations, serving an apprenticeship at coopering and milling, at clerkship and traveling salesman; has lived on his present farm for the past twenty-eight years, and is engaged in general farming, trucking, fruit growing and bee-keeping; has acquired practical and scientific information by observation and study; speaks English and German.

LEON OTICE VAN NOY was born in Troy, Pa., 1876, on a dairy farm. At the age of six years his father started in the pure blood cattle. Was educated in the public school, Troy High School and took special work in general agriculture and dairy farming for three years at the Pennsylvania State College. He returned and went into partnership with his father in the dairy business and made a number of experiments in feeding for profit. In the fall of 1900, he was forced to quit his father's farm on account of ill health and traveled for a few years. Was in and through 34 states. During this time he worked at a number of occupations besides farming. Had a great opportunity to compare city life with country life. In 1906 he returned to his father's farm and took the management of it. Has a private creamery and at the present time is trying to solve the problem of the direct route from the producer to consumer.

WILLIAM HENRY TOMHAVE was born at Fergus Falls, Minnesota, December 19, 1881. He attended the common schools until fifteen years of age. At the age of eighteen he entered the Minnesota Agricultural High School at St. Anthony Park, from which he graduated in 1902. In the fall of 1903 he entered the College of Agriculture at the University of Minnesota, graduating in 1907. In the fall of 1907 he came to Pennsylvania State College as Assistant in Animal Husbandry. He resigned his position in the spring of 1908 to go to Manchuria, China, as Livestock Expert for the Manchuria Government. In 1910 he returned to the United States to take charge of the Livestock Extension work at the University of Minnesota. In the summer of 1912 he was appointed Professor of Animal Husbandry at the Pennsylvania State College which position he now holds.

RAYMOND S. SMITH, was born in Ohio and soon after moved to southern California where he was reared on a large fruit and general farm. He was graduated from Pomona College in 1907, spent one year teaching, two years farming, and then entered the College of Agriculture of the University of Illinois. He was there with the State Soil Survey for two seasons and was graduated in Agriculture in 1913. His present work is teaching Soils at the Pennsylvania State College.

W. THEO. WITTMAN was born and raised on a farm in Lehigh county. As a small boy he was particularly interested in poultry and fruit growing and has always since retained a strong interest in both these branches of agriculture, constantly studying and working with both. He is now Poultry Judge with a National reputation, and his name is constantly appearing in the better class of poultry journals as a contributor to the poultry knowledge of the day. He has written several books on poultry keeping that are largely advertised and have commanded a big sale. As Superintendent of the Poultry Department of the Great Allentown Fair he has built up there one of the very finest and best displays of pure breed poultry to be seen anywhere in this country, greatly stimulating the interest in better poultry among farmers and others throughout eastern Pennsylvania and thereby enhancing the market value of their poultry and poultry products enormously.

D. H. WATTS was born near Kerrmoor, Pa., May 25, 1861; was raised on the farm of his father, Martin Watts, and educated in the public schools, which schooling was supplemented by a few months attendance at the Indiana State Normal School. He always has been interested in farmer's organizations and served two years as President of the Clearfield County Agricultural Society. He located upon his farm in 1886 and erected thereon modern buildings and established a dairy plant, where fine butter for a special trade is produced. The growing of fruits is also a specialty. On his farm known as "Orchard View Farm," there are 3,000 apple, peach, pear and plum trees, all his own selection and planting.

JOHN W. WHITE was born in Greenville, North Carolina, 1883. He received his elementary training in the public schools of that city and graduated from Bethel High School in 1899. Entered North Carolina Agricultural and Mechanical College and graduated in 1903. He spent the first three years after graduation in Chemical research and was appointed Assistant Chemist, Pennsylvania Experiment in 1906. In 1911 he obtained leave of absence and entered University of Illinois graduate school obtaining the degree of Master of Science in Agriculture in 1912. He was appointed Soils Research Chemist and Associate in Agronomy at the Pennsylvania State College in July, 1912, in which capacity he is still serving.

E. L. WORTHEN was born and reared on a farm in Illinois. He graduated at the University of Illinois in 1904. He was connected with the Illinois College and Station until 1906. From 1906 to 1909 he was Scientific Assistant in the National Bureau of Soils then in charge of "Soil Investigations," North Carolina Department of Agriculture until January, 1913, when he came to the Pennsylvania State College and Station as Assistant Professor of Agronomy. He has spent one year in graduate study at the Cornell University and received the degree of Master of Science in Agriculture in 1908. His present work consists of the teaching and investigation in Soils and Fertilizers.

W. R. WHITE was born on a farm near Grove City, Mercer county, Pennsylvania. He graduated from the Classical Course in Geneva College, in 1901. He taught school one year, was in the Civil Engineering Department of the Pittsburg and Lake Erie Railroad three years, and graduated from the Agricultural Course in Pennsylvania State College in 1907. He was Assistant in Correspondence Courses, Pennsylvania State College from 1907 to 1908 and was Farm Superintendent near Pittsburgh from 1908 to 1911. In 1911 he returned to Pennsylvania State College and at present is Assistant Professor of Agricultural Education in the Pennsylvania State College, State College, Pennsylvania.

Directions: County Chairmen and Local Institute Committees will please use the following outline for heading of program and follow as far as practicable the classification of subjects, embracing no more than two distinct topics for one session. The address of Welcome and Response can be omitted and a brief introductory by the County Chairman substituted when Local Committee deem advisable.

SAMPLE PROGRAM This Sample is Designed as an Aid to Institute Managers in Making up Their Programs.

PROGRAM

OF THE

..... COUNTY.

FARMERS' INSTITUTES

TO BE HELD UNDER THE AUSPICES OF

DEPARTMENT OF AGRICULTURE
OF PENNSYLVANIA

DIVISION OF FARMERS' INSTITUTES.



IN HALL

..... PA.

FRIDAY AND SATURDAY, DEC. 5 AND 6, 1912

EXERCISES PUBLIC AND FREE—EVERYBODY IS INVITED.

ORDER OF BUSINESS

OPENING SESSION

Devoted to Soil Conditions

Wednesday Afternoon, December 3, 1:30.

Presiding Officer,

Opening Exercises.

Soil Fertility.

Soil Cultivation.

How to Converse Soil Moisture.

(Question Box.)

Adjournment.

EDUCATIONAL SESSION.

Wednesday Evening, December 3, 7:00.

Nature Study for County Schools.

Essential Qualifications to Successful Teaching.

Attractive Country School Grounds.

The Central Township School.

Adjournment

DAIRY, STOCK AND POULTRY SESSION

Thursday Morning, December 4, 9:00.

(Question Box.)

Feed for the Dairy Cow.

The Silo As An Economic Investment in the Dairy.

Poultry Breeding and Feeding for Profit.

Adjournment.

Thursday Afternoon, December 4, 1:30.

(Question Box.)

Good Country Roads; How Obtained.

Sheep Husbandry.

Legumes for Feed and Fertility.

Adjournment.

LADIES' SESSION

In the Interest of Country Homes.

Thursday Evening, December 4, 7:00.

Music.

A Model Home.

What Books and Magazines Shall We Read; The Quality and Preparation of Food.

Heating, Lighting, Ventilating and Sanitary Arrangement of Country Homes.

Lawn and Garden.

Social Life in Rural Districts.

Adjournment.

SPECIAL NOTICE

The foregoing order will be followed as closely as possible, but other exercises will be introduced, if found desirable.

Although these institutes are designed and conducted for the education and advantage of farmers, yet all who are interested are invited to attend, and it is hoped that they will show their appreciation, not only by being present at the meetings, but also by taking part in the discussions.

ASK QUESTIONS

A question box will be kept upon the secretary's desk, and all are invited to place therein such questions as they may wish to have discussed during the session. At the proper time, designated by the meeting, these questions will be referred to some one for answer, or brought up for general discussion.

All granges, alliances, agricultural societies and kindred agricultural organizations are specially invited to attend.

For further information, and for programs, address,

Name,

Address,

Chairman of the Board of Institute Managers for _____ County.

Local Committee.	Committee on Question.	County Board of Managers.
Wm. Stevens Address Mrs. Jane Welly, Address Miss Emma Stone, Address	William Stover, Address, Miss Jane Miller, Address,	J. A. Walker, Address, Wm. Cedars, Address, John Williams, Address,

MEANS OF ACCESS

Trains on the B. C. R. R. arrive from the East at 8:30 A. M. and 5:19 P. M.; from the West at 9:40 A. M. and 9:38 P. M.

On the P. R. R. trains from the East arrive at 4:52 and 9:54 A. M. and 4:32 P. M.; from the West at 10:18 A. M. and 5:08 and 9:23 P. M.

Commonwealth of Pennsylvania

DEPARTMENT OF AGRICULTURE
DAIRY AND FOOD BUREAU

BULLETIN NO. 271

Creameries, Cheese Factories, Milk Condenseries and Canners of Pennsylvania

A LIST BY COUNTIES

COLLECTED AND COMPILED BY
L. H. WIBLE, Statistician, Department of Agriculture



CHARLES E. PATTON, *Secretary of Agriculture.*
JAMES FOUST, *Dairy and Food Commissioner.*

PUBLISHED BY DIRECTION OF THE SECRETARY
1915

HARRISBURG, PA.:
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1916



PREFACE

The manufacture of milk products and the canning of fruits and vegetables in Pennsylvania are already extensively developed in nearly every county. They represent a large investment of capital by a great many citizens, afford local markets for an army of milk producers and horticulturists, and are, from many points of view, two of our most important industries.

The volume of the inquiries received concerning the manufacturers of these products has convinced me that the following list of creameries, cheese factories, condenseries and canning factories, which has been prepared at my request, will be of much public value.

CHARLES E. PATTON,
Secretary of Agriculture.



Harrisburg, Pa., December 1, 1915.

Hon. Charles E. Patton, Secretary of Agriculture, Harrisburg, Pa.

Dear Sir: I submit, with the recommendation that it be published as a Bulletin of the Department, the following list of the creameries, cheese factories, condenseries and canneries in the several counties of the Commonwealth. This list, prepared at your request, has been collected and compiled through the courteous and efficient co-operation of Mr. L. H. Wible, Statistician.

Very respectfully,

JAMES FOUST,
Dairy and Food Commissioner.



List of Creameries, Cheese Factories, Milk Condenseries and Canneries in Pennsylvania, by Counties. Collected and Compiled by L. H. Wible, Statistician, Department of Agriculture.

ADAMS COUNTY

CREAMERIES

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Arendtsville Creamery,	Hershey Creamery Co.,	Harrisburg.
Barlow Creamery,	Gettysburg Ice & Cold Storage Co.	Gettysburg.
Gardners Creamery,	Jones Dairy Co.,	Philadelphia.
Germany Creamery,	East Berlin Creamery Co.,	East Berlin.
Gettysburg Ice & Cold Storage Co.	C. B. Dougherty, Mgr.,	Fairfield.
Hanover Creamery Co.,	H. M. Stokes, Mgr.,	Two Taverns.
Hanover Creamery Co.,	H. M. Stokes, Mgr.,	Hanover.
Hampton Creamery,	Hershey Creamery Co.,	East Berlin.
Hershey Creamery Co.,	D. J. Sell,	East Berlin.
Hershey Creamery Co.,	D. J. Sell,	Centre Mills.
Hershey Creamery Co.,	D. J. Sell, Mgr.,	Table Rock.
Hershey Creamery Co.,	D. J. Sell, Mgr.,	Abbottstown.
Kingsdale Creamery,	H. M. Stokes, Mgr.,	Kingsdale.
Littlestown Creamery,	H. M. Stokes, Mgr.,	Littlestown.
New Oxford Creamery,	H. M. Stokes, Mgr.,	New Oxford.
Orrtanna Creamery,	H. F. Starner, Mgr.,	Orrtanna.
Roudebush's Creamery,	A. T. Roudebush,	Aspers.
Sells Station Creamery,	H. M. Stokes, Mgr.,	Sells Station.
York Spring Creamery Sta., ..	W. M. Davis, Mgr.,	York Springs.

MILK CONDENSERIES

Biglerville Condensery,	Hershey Creamery Co.,	Biglerville.
Farmers' & Hershey Cmy. Co.,	Hershey Creamery Co.,	Table Rock.

CANNERIES

Adams County Preserving Co.,	W. E. Grove,	York Springs.
Littlestown Cannery,	B. F. Schriver & Co.,	Westminster, Md.
Musselman Canning Co.,	C. H. Musselman,	Biglerville.
Orrtanna Canning Co., Ltd., ..	I. H. Musselman, Mgr.,	Orrtanna.
Smith-Yingling Co.,	A. H. Yingling, Supt.,	Kingsdale.

ALLEGHENY COUNTY

CANNERIES

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Cruikshank Bros. Co.,	Frank Cruikshank, Mgr.,	Preble and Island Ave., N. S. Pittsburgh.
H. J. Heinz Co.,	Charles Heinz, Supt.,	Pittsburgh.
Hilltop Pure Food Co., Ltd., ..	U. C. Kramer, Mgr.,	Taft and Boggston Aves., Mt. Oliver, Pittsburgh.
Hirsch Brothers Co.,	Frank Hirsch, Supt.,	48 Terminal Way, Pittsburgh.
Lutz & Schram Co.,		Pittsburgh.

BEAVER COUNTY

CANNERIES

Conoquenessing Cannery,	E. E. Hazen,	Celia.
Eckert & Alexander's Cannery, ..	Charles R. Eckert,	Monaca.
.....	H. C. Majors,	New Brighton.

BEDFORD COUNTY

CREAMERIES

Barley Creamery,	J. I. Barley,	Bakers Summit.
Echo Vale Creamery,	Richard C. Hall,	Bedford.
New Enterprise Creamery,	Johnstown Sanitary Dairy Co.,	New Enterprise.
Woodbury Creamery,	Johnstown Sanitary Dairy Co.,	Johnstown.

BERKS COUNTY

CREAMERIES

Albany Creamery,	Morris Bauscher,	Albany.
Amityville Creamery,	J. H. Shure, Mgr.,	Douglassville, R. D. No. 3.
Bagenstose Creamery,	Ira Bashore, Mgr.,	Bernville, R. D. No. 2.

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Barto Creamery,	H. Harbison,	Barto.
Bechtelsville Creamery,	C. S. Herbein,	Bechtelsville.
Berne Creamery,	Green & Mathias,	Berne.
Bernville Creamery,	Hershey Chocolate Co.,	Bernville.
Birdsboro Creamery,	H. Dolfinger,	Birdsboro.
Bethel Creamery,	Hershey Chocolate Co.,	Bethel.
Clayton Butter & Cheese Co.,	Josephus Gerhard, Mgr.,	Clayton.
Dairy Creamery,	H. A. Confer,	Hamburg.
Douglassville Creamery,	J. H. Shure, Mgr.,	Douglassville, R. D. No. 4.
Franklin Street Creamery,	Miller Brothers,	9th and Franklin Sts., Reading.
Freidensburg Creamery,	A. Weiss,	Friedensburg.
Fleetwood Creamery,	Daniel F. Kelschner,	Fleetwood.
Gablesville Creamery,	Jacob G. Werstler,	Boyetown.
Griesemersville Creamery,	M. B. Clouser,	Griesemersville.
Haag's Creamery,	A. J. Haag,	Shartlesville.
Hancock Creamery Co.,	Breyer Ice Cream Co.,	9th and Cumberland Sts., Philadelphia.
Hershey Chocolate Co.,	P. N. Hershey, Mgr.,	Lebanon.
Hershey Chocolate Co.,	John Haag, Mgr.,	Robesonia.
Hershey Chocolate Co.,	P. N. Hershey,	Mt. Etna.
Hill Church Creamery,	Ambrose H. Weller,	Bechtelsville, R. D. No. 2.
Host Creamery,	G. E. Brownback,	Linfield.
Hixson Creamery,	William H. Hixson,	Fleetwood.
Huff's Church Creamery,	Edwin R. Moyer,	Alburtis, R. D.
Iron Stone Creamery,	H. B. Nuss, Prop.,	Little Oley.
Jalappa Creamery, .....	.....	Hamburg.
Kempton Creamery,	T. G. Hufnal,	Kempton.
Keystone Creamery,	W. M. Toole,	917 Cherry St., Reading.
Klinesville Creamery,	A. O. Kunkle,	Klinesville
Krumsville Creamery,	Yost & Sittler,	Kutztown, R. D. No. 1.
Kutztown Creamery,	C. M. Richardson, Prop.,	Kutztown.
Landis Store Creamery,	John D. Keim,	Landis Store.
Lenhartsville Creamery,	Francis B. Leban,	Lenhartsville.
Lesh's Creamery,	F. H. Lesh,	Hamburg, R. D. No. 4.
Lobachsville Creamery,	C. S. Herbein,	Bechtelsville.
Lobartsville Creamery,	George H. Seip,	Lobartsville.
Maiden Creek Creamery,	H. Dolfinger,	Calcium.
Meck's Creamery,	Jacob R. Meck,	Meckville.
Mertztown Creamery,	Richardson & Snyder,	Mertztown.
Monocacy Creamery,	H. Dolfinger,	Douglassville.
Morgantown Creamery,	J. W. Hantz, Prop.,	Morgantown.
Moselem Spring Creamery,	D. F. Kelchner,	Fleetwood.
Mt. Pleasant Creamery,	Hershey Chocolate Co.,	Bernville. R. D. No. 2.
New Jerusalem Creamery,	William G. Henry,	Mertztown, R. D. No. 2.

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Oley Line Creamery,	M. C. Cleaver, Prop.,	Lime Kiln.
Oley Valley Creamery,	Alvin Weiss,	Oley.
Pleasantville Creamery,	Henry C. Cleaver,	Manatawny.
Rehrersburg Creamery,	Hershey Chocolate Co.,	Hershey.
Robesonia Creamery,	Klopp & Kalbach,	Robesonia, R. D. No. 1.
Stouchsburg Creamery,	Salem Yost,	Myerstown.
Spannuth's Creamery,	A. A. Spannuth,	Myerstown, R. D. No. 3.
Stoudt's Creamery,	Daniel Stoudt, Sr.,	Mohrsville, R. D. No. 1.
Scull Hill Creamery,	Howard Fraunfeller,	Mohrsville.
Topton Creamery, .....	.....	Topton.
Union Mills Creamery,	C. D. Hoffman,	Boyertown.
Upper Berne Creamery,	Alfred B. Steely,	Hamburg.
Wertley's Creamery,	Alfred P. Wertley,	South Fourth St., Hamburg.
Windsor Castle Creamery,	Calvin Smith, Supt.,	Hamburg, R. D. No. 2.
Womelsdorf, Creamery	Wilson H. Degler,	Womelsdorf.
Yellow House Creamery,	Yellow House Creamery Asso.,	Yellow House.

CHEESE FACTORIES

Bechtelsville Creamery,	C. S. Herbein,	Bechtelsville.
Lobachsville Creamery,	C. S. Herbein,	Bechtelsville.

BLAIR COUNTY

CREAMERIES

At Ice Plant,	Barnett & Hoover,	Roaring Springs.
Fairview Dairy,	Roy L. Calvert,	1210 Tenth St., Al- toona.
Martinsburg Creamery,	Johnstown Sanitary Dairy Co.,	Martinsburg.

MILK CONDENSERIES

The W. E. Hoffman Co.,	Harry Tomb,	Johnstown.
Alba Creamery,	W. E. Hoffman,	Tyrone.

BRADFORD COUNTY

CREAMERIES

Alba Creamery,	George Freeman,	Alba.
Alba Butter & Cheese Co.,	G. P. Freeman, Mgr.,	Alba.
Alfalfa Dairy Co.,	Charles H. Cook,	Trenton, N. J.
Allen Creamery,	G. E. Allen,	New Albany.

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Allis Hollow Creamery,	Bradford County Crmy. Co.,	Laceyville.
Athens Creamery,	W. E. Dalrymple,	Athens.
Austinville Co-operative Creamery Co.,	E. T. Bullock, Mgr.,	Columbia X Roads.
Bentley Creek Creamery,	Edson Brothers,	110 Dock St., Philadelphia.
Borden's Creamery,	Borden Milk Co.,	New York City.
Bradford County Creamery Co.,	R. J. Crandall,	Stevensville.
Bradford County Creamery, ..	Stanley C. Moore,	Rome, R. D. No. 17.
Brown's Creamery,	Lloyd L. Brown,	Towanda, R. D. No. 8.
Burlington Creamery,	Edson Brothers,	110 Dock St., Philadelphia.
Cadis Creamery,	Daniel Ringrose, Sec.,	Cadis.
Campbell Creamery,	W. F. Campbell,	Athens, R. D. No. 26.
Canton Creamery,	J. T. Burlingame,	Canton.
Durall Creamery,	William Buchanan,	Towanda, R. D. No. 9.
East Smithfield Dairy Co.,	E. G. Kingsley,	East Smithfield.
East Troy Creamery Co.,	A. F. Van Horn, Mgr.,	Troy.
Farmers' Creamery,	Daniel O'Sullivan,	Towanda, R. D. No. 2.
Franklindale Creamery Co., ...	R. L. Bevan, Sec.,	Towanda, R. D. No. 8.
Gillett Creamery,	Edson Brothers,	110 Dock St., Philadelphia.
Glenside Creamery,	L. D. Day,	Granville Centre.
Granville Summit Creamery, ..	Granville Summit Crmy. Co.,	Granville Summit.
Hawthorne Creamery,	F. G. Allen,	Monroeton.
Herrickville Creamery,	John McCauley,	New York City, N. Y.
Hollenback Creamery,	Edward Kooke,	Sugar Run, R. D. No. 4.
Hellenback Creamery,	Charles H. Snyder,	Sugar Run.
Hornets Ferry Creamery,	R. F. Stevens,	Wyalusing, R. D. No. 39.
Horseheads Creamery Co.,	H. Holvert,	Laceyville.
Jersey Milk & Cream Co.,	C. H. Shafer, Mgr.,	North Towanda.
Laddeburg Creamery,	A. A. Campbell, Mgr.,	New Albany.
LeRaysville Creamery,	West Auburn Creamery Co.,	LeRaysville.
LeRoy Creamery,	J. T. Burlingame, Mgr.,	Canton.
Lix Creamery,	Sayre Cold Storage & Butter Co.,	Rome, R. D. No. 15.
Meadow Brook Creamery,	J. B. Burlingame,	Canton.
Merryall Creamery,	C. H. Rider,	Wyalusing, R. D.
Milan Creamery,	Milan Creamery Co.,	Sayre.
Milltown Creamery,	George Norris & Co.,	Sayre.
Moore Creamery,	Bradford County Crmy. Co.,	Towanda.
Mosherville Creamery,	Horseheads Creamery Co.,	Horseheads, N. Y.
Neath Creamery,	West Auburn Crmy. Co.,	Neath.

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
New Albany Creamery,	John Dalrymple,	51 Brinkerhoff St., Jersey City, N. J.
New Era Creamery Co.,	Cook & Jones,	217 Mercer St., Trenton, N. J.
North Rome Creamery,	Bradford County Crmy. Co.,	Laceyville.
Overton Creamery,	John Dalrymple,	51 Brinkerhoff St., Jersey City, N. J.
Rider Creamery,	C. H. Rider,	Wyalusing, R. D. No. 38.
Rome Creamery,	Bradford County Crmy. Co.,	Laceyville.
Rummerfield Creamery,	John F. McCauley,	New York City, N. Y.
Saco Skimming Station,	Edson Brothers,	110 Dock St., Phila- delphia.
Sayre Crmy. & Cold Storage	Edson Brothers,	110 Dock St., Phila- delphia.
Sayre Creamery,	W. S. Kimmich & Co.,	Sayre.
Sayre Cold Storage,	Sayre Cold Storage & Cream- ery Co.,	Sayre.
P. E. Sharpless Co.,	A. T. Crandall, Mgr.,	Troy.
Sheffield Dairy Farms,	Slawson, Decker & Co.,	Canton.
Shores Hill Creamery,	Bradford County Crmy. Co.,	Laceyville.
Silvara Creamery,	Bradford County Crmy. Co.,	Laceyville.
Silverdale Creamery Co.,	J. M. Smiley,	Canton, R. D.
South Warren Creamery,	West Auburn Creamery Co.,	West Auburn.
Standing Stone Creamery,	Farmers' Dairy Despatch Co.,	Standing Stone.
Stevensville Creamery,	Bradford County Crmy. Co.,	Laceyville.
Terrace Creamery,	William S. Sweet,	Troy.
Towanda Valley Creamery Co.,	Co-operative,	Powell, R. D. No. 49.
Warren Centre Creamery,	William Beebe, Sec.,	Warren Centre.
Wells Creamery,	Mr. Bready,	Gillett.
West Auburn Creamery,	West Auburn Creamery Co.,	Rome, R. D. No. 16.
West Warren Creamery,	Sayre Butter Co.,	Sayre.
Wickizer's Creamery,	A. F. Wickizer,	Towanda.
Wilawana Creamery,	Henry Bauch Co.,	Wilawana.
Windham Center Creamery, ..	Sayre Cold Storage & Butter Co.,	Nichols, N. Y. R. D. No. 2.
Windham Center Creamery, ..	C. P. Van Dyke, Pres.,	Sayre.
Wyalusing Creamery Co.,	C. W. Newman, Sec.,	Wyalusing.
Wysox Station Creamery,	Louis Piolet,	Wysox.

CHEESE FACTORIES

Clover Leaf Cheese Co.,	Arthur Burlington, Sec.,	Rummerfield.
Coryland Cheese Factory,	George Knapp,	Gillett.
Daisy Cheese Co.,	E. C. Wood, Pres.,	LeRaysville.
Eastern Bradford Cheese Fac- tory.	A. Alderson,	LeRaysville.
Golden Rod Cheese Co.,	E. C. Ingham,	Camptown

MILK CONDENSERIES

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
P. E. Sharpless Co.,	P. E. Sharpless Co.,	Troy.

CANNERIES

Merrill Cannery,	A. L. Merrill & Son,	Sayre.
Miller Canning Co.,	James E. Miller,	Monroeton.

BUCKS COUNTY

CREAMERIES

Bedminster Dairymen's Asso.,	Harry E. Boost, Mgr.,	Bedminster.
Blooming Glen Creamery,	Moyer & Co.,	Blooming Glen.
Bursonville Creamery,	Edward Haney,	Bursonville.
Carversville Co-operative Creamery, ....	.....	Carversville.
Chalfont Creamery,	Adam McLean,	Chalfont.
Church Hill Creamery,	A. Fraser,	Weisel.
Cold Spring Creamery,	Co operative,	Doylestown.
Cold Spring Creamery,	Tilden Bleam,	Richland Centre, R. D. No. 1.
Curley Hill Creamery,	Asher R. Lear,	Doylestown.
Deep Run Creamery,	Thornton I. Ulmer,	Perkasie, R. D. No. 2.
Doylestown Creamery,	A. R. Lear,	Doylestown.
Ferndale Creamery,	Theo. M. Moyer,	Ferndale.
Forest Grove Creamery,	Co-operative,	Forest Grove.
Gardenville Dairymen's Asso.,	I. Long, Pres.,	Gardenville.
Green Valley Dairymen's Asso.,	G. C. Widney, Sec.,	Chalfont, R. D. No. 1.
Kellers Church Creamery,	Mahlon Gulden,	Keller's Church.
Kumry Creamery,	H. H. Stivel,	Quakertown, R. D. No. 2.
Lansdale Pure Food Co.,	William E. Morris, Pres.,	Perkasie.
Levin Dairy Asso.,	Oscar Rosenberger, Mgr.,	Chalfont, R. D.
Mechanicsville Creamery,	Asher Lear,	Mechanicsville.
Milford Square Creamery,	Reuben D. Landis,	Milford Square.
New Britain Creamery,	B. H. Stevens,	New Britain.
North Branch Creamery,	Edwin H. Strouse,	Perkasie, R. D. No. 1.
Ottsville Dairymen's Asso., ...	Tobias Hoffer,	Ottsville.
Paletown Creamery,	Allen K. Moyer,	Quakertown.
Passer Creamery,	Tilden Bleam,	Passer.
Pipersville Creamery,	Elias Ulmer,	Pipersville.
Pleasant Valley Creamery,	Greup & Musselman,	Pleasant Valley.
Plumsteadville Creamery Asso.,	William H. Rush, Sec.,	Plumsteadville.
Richlandtown Creamery,	James H. Shelly,	Richlandtown.
Rosedale Creamery,	John E. Beidler,	Shelly.
Sinking Spring Creamery,	V. H. Romig, Mgr.,	Jenkintown.

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Solebury Creamery,	William Strouse,	Solebury.
Spinnerstown Creamery Co., ..	Co-operative,	Spinnerstown.
Steinsburg Creamery,	John C. Beidler,	Steinsburg.
Tinicum Creamery,	Tinicum Dairymen Asso.,	Pipersville, R. D.
Tohickon Creamery,	Mahlon Gulden,	Perkasie, R. D.
Trumbauerville Creamery,	H. H. Trumbauer,	Trumbauerville.
Union Dairymen's Asso.,	Harry E. Ott, Mgr.,	Wismer.
Warwick Creamery,	Warwick Dairymen's Asso., ..	Jamison.

CANNERIES.

Church Hill Cannery,	Eastburn Gulden,	Weisel.
Horse Radish Factory,	C. B. Ellin,	Morrisville.
Lansdale Pure Food Co.,	William E. Norris, Pres.,	Perkasie.

BUTLER COUNTY

CREAMERIES

Butler Pure Milk Co.,	J. J. & D. A. Shanner,	Butler.
Jamison Creamery,	W. B. Jamison,	Emlenton, R. D. No. 65.
Portersville Creamery,	R. V. Thompson,	1649 Perrysville Av., N. S., Pittsburgh.

CANNERIES.

C. M. Hilliard & Co.,	C. M. Hilliard,	Butler.
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CAMBRIA COUNTY

CREAMERIES

Somerset Dairy Co.,	D. M. Baker, Mgr.,	Johnstown.
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CENTRE COUNTY

CREAMERIES

Korman Creamery,	Korman, Meyer & Weaver, ..	Coburn.
Patrons Co-operative Creamery,		Centre Hall.
Rock Spring Creamery, Ltd., ..	W. E. Hoffman,	Pennsylvania Fur- nace.
Spring Mills Creamery Co., ..	T. M. Gramley,	Springs Mills.
State College Creamery,	State College,	State College.

MILK CONDENSERIES

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Continental Condensed Milk Co.	W. O. Gremley, Mgr.,	Spring Mills.

CHESTER COUNTY

CREAMERIES.

Abbotts Alderney Dairies,	George Abbott,	Philadelphia.
Baker's Creamery,	J. Thomas Baker,	Westgrove.
Baker's Creamery,	J. Thomas Baker,	Avondale.
Beaver Valley Creamery,	Thomas Hadfield,	Downingtown, R. D. No. 1.
Birchrunville Creamery,	R. C. Sturgis,	Birchrunville.
Brendlinger's Creamery,	Charles Brendlinger,	Spring City, R. D. No. 2.
Bridge Farm Creamery,	William D. Marshall & Son, ..	Lyndell.
Brosius Creamery,	S. G. Brosius,	Westgrove.
Byes Creamery,	F. W. Byes,	Lewisville.
Carter's Creamery,	J. Clarence Carter,	Chatham.
Chadds Ford Creamery,	E. Darlington & Brother,	Chadds Ford Junction.
Chatham Creamery,	J. Clarence Carter,	Chatham.
Collamer Creamery,	Abbott Alderney Dairies,	Collamer.
Compass Creamery,	M. R. Darlington,	Compass.
Corn Hollow Creamery,	Jefferson Marlin,	Kemblesville.
Cossatt Creamery,	E. Darlington & Bro.,	Cossatt.
Cream Creamery,	Turner & Westcott,	Oxford.
Crystal Springs Creamery,	P. E. Sharpless Co.,	Unionville.
Deer Park Creamery,	Jerome Reynolds,	Landenburg.
H. Dolfinger Creamery,	H. Dolfinger,	Elverson.
East Coventry Skimmer,	Garrett E. Brownback,	Parker Ford.
East Coventry Creamery,	Garrett E. Brownback,	Pottstown, R. D. No. 3.
Fairmount Creamery,	L. H. Evans, Secy.,	Font.
Glen Roy Dairies,	Turner & Westcott,	Glen Roy.
Green Lawn Creamery,	M. Darlington's Sons,	Green Lawn.
Hires Condensed Milk Co.,	C. E. Hires,	Malvern.
Honey Brook Creamery,	J. W. Scott,	Philadelphia.
Jordan Dairy,	E. A. Pugh,	Oxford, R. D. No. 2.
Kelton Creamery,	Abbott Alderney Dairies,	Philadelphia.
Kemblesville Creamery,	Theo. W. Bye,	Kemblesville.
Kimberton Creamery,	H. K. Moses,	Kimberton.
Kirk's Creamery,	Frank Kirk,	Lincoln University, R. D.
Landenberg Creamery,	Supplee Brothers,	Landenberg.
Lenover Creamery,	Gideon Beller,	Lenover.
Lincoln Creamery Assoc.,	E. L. Garber & Son,	Lincoln.

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Lincoln University Creamery, ..	Abbott Alderney Dairies,	Philadelphia.
London Grove Creamery,	E. B. Sharpless, ...	Avondale.
Mendenhall Creamery,	P. E. Sharpless Co.,	Mendenhall.
Oxford Creamery,	Abbott Alderney Dairies,	Philadelphia.
Pugh Creamery,	E. A. Pugh,	Oxford.
Pughtown Creamery,	Brendlinger Brothers,	St. Peters, R. D. No. 2.
Quaker City Dairies,	E. C. Dukeman, Mgr.,	Supplee.
Red Hill Creamery,	A. C. Roberts,	Sheeders.
Russellville Creamery,	Turner & Westcott,	Russellville.
Spring City Creamery,	J. H. Fry,	Spring City, R. D. No. 2.
Stony Run Creamery,	Fry & Barr,	Spring City, R. D.
Supplee Alderney Dairy,	Supplee Brothers, ..	Cochranville.
Toughkenamon Creamery,	P. E. Sharpless Co.,	Toughkenamon.
Turner & Westcott Creamery, ..	Turner & Westcott,	Glen Roy.
Velvadeer Creamery,	H. H. Jeffries,	Landenberg.
Unionville Creamery,	P. E. Sharpless Co.,	Unionville.
Wagontown Milk Skimming Station.	E. W. Wollman,	Wagontown.
West Caln Creamery,	J. H. Schrack & Son,	Coatesville.
West Chester Dairy,	Ziba C. Martin, Supt.,	West Chester.
West Grove Creamery,	Abbott Alderney Dairies,	Philadelphia.
Worths Creamery,	Dr. Worth,	Kemblesville.
Wrightsdale Creamery,	Turner & Westcott,	Nottingham.

CHEESE FACTORIES.

Green Lawn Cheese Factory, ..M. Darlington's Sons,

MILK CONDENSERIES

Hires Condensed Milk Co.,C. E. Hires,

Toughkennamon Condensery, ..P. E. Sharpless,

CLARION COUNTY

CREAMERIES

Callensburg Creamery,

Church Creamery,

Enterprise Creamery,

Fisher Creamery,

Knight Creameries,

Lucinda Elgin Creamery Co., ..

Salem Creamery,

CLINTON COUNTY

CREAMERIES

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Continental Condensed Milk Co.	R. B. Page, Supt.,	Millhall.
Loganton Creamery,	W. G. Berry,	Loganton.

MILK CONDENSERIES

Continental Condensed Milk Co.	R. B. Page, Pres.,	Millhall.
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COLUMBIA COUNTY

CREAMERIES

Berwick Creamery,	Earnest Clewell, Operator,	Berwick.
Millville Creamery,	William Eckman,	Millville.

CRAWFORD COUNTY

CREAMERIES

Britton Run Creamery,	C. E. Penoyer,	Spartansburg.
Butler Pure Milk Co.,	Butler Pure Milk Co.,	Butler.
Butler Pure Milk Co.,	J. J. Shanor, Pres.,	Conneautville.
Cambridge Springs Crmy.,	A. H. Caldwell,	Cambridge Springs.
Centerville Creamery,	F. L. Kelly, Sec.,	Centerville.
Cloverdale Creamery,	Jesse E. Kunz,	Titusville, R. D. No. 76.
Hickernell Creamery,	S. C. Stall,	Springboro.
Little Cooley Co-operative Creamery,	Mrs. Mary Southworth,	Townville, R. D. No. 71.
Martin Creamery,	George McClelland,	Westford.
North & Sweeney Creamery,	Edward E. Reick Co.,	Pittsburgh.
Penn Line Creamery,	McGraw Cheese & Butter Co.,	Linesville.
Red Oak Creamery,	John Hopkins,	Spartansburg, R. D. No. 84.
J. W. Rice Creamery,	J. W. Rice,	Harmansburg.
Riceville Creamery,	George Robinson,	Riceville.

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
J. J. Shanor & Sons,	Butler Pure Milk Co.,	Couneautville.
Sparta Creamery Assoc.,	H. D. Burton, Sec.,	Spartansburg.
Thomastown Creamery,	Charles Fraley & Son,	Cambridge Springs.
Tiletsons Corners Crmy.,	John Robinson,	Union City, R. D. No. 5.
Titusville Butter & Ice Cream F. C. Kerr, Sec.,		Titusville. Co.
Tyronville Creamery,	Waid & Hopkins,	Tyronville.

CHEESE FACTORIES.

Adamsville Cheese Factory, ..	The L. C. McGraw Cheese Co.,	Meadville.
Beaver Center Cheese Factory,	Edward E. Reick Co.,	Pittsburgh.
Birchard Cheese Factory,	A. W. Stone,	Cambridge Springs.
Blystone Cheese Factory,	M. L. Hall,	Cambridge Springs.
Crossingville Cheese Factory, ..	C. W. Hollenbach,	Crossingville.
Dicksonburg Cheese Factory, ..	The L. C. McGraw Cheese Co.,	Meadville.
Drakesmills Cheese Factory, ..	Harry Helmbrecht,	Cambridge Springs.
Espyville Cheese Factory,	M. L. Kelley,	Espyville.
Guys Mills Cheese Factory, ...	The L. C. Magaw Cheese Co.,	Meadville.
Hartstown Cheese Factory,	Hall & Gehr,	Hartstown.
Isherwood Corners Cheese Fac-	George Taylor,	Cambridge Springs. tory.
Jewell Cheese Factory.	Brady Hutchinson,	Teepleville.
Lincolntown Cheese Factory. ..	Obert Estate,	Lincolntown.
Linesville Cheese Factory, ...	Farmers' Protective Assoc., ..	Linesville.
Lyona Cheese Factory,	Felix Reichart,	Randolph.
Mosiertown Cheese Factory, ..	Wood & Hishman,	Venango.
Penn Line Cheese Factory, ...	The L. C. Magaw Cheese Co.,	Meadville.
Pinneys Corners Cheese Fac-	Lyle Sybrant,	Cambridge Springs. tory.
Rockdale Cheese Factory,	J. L. Wykoff,	Cambridge Springs.
Rock Spring Cheese Factory, ..	The L. C. Magaw Cheese Co.,	Meadville.
Rundell Cheese Factory,	The L. C. Magaw Cheese Co.,	Meadville.
Sheakleyville Cheese Factory, ..	A. Wall,	Sheakleyville.
Teepleville Cheese Factory, ...	George Bertram,	Teepleville.
Townville Cheese Factory,	A. L. Squier,	Townville.
Venango Cheese Factory,	Edward Hishman,	Venango.
Wayne Center Cheese Factory,	Crawford Cheese Co.,	Meadville.
Westford Cheese Factory,	G. N. McClelland,	Westford.
Woodcock Cheese Factory,	King & Hishman,	Cambridge Springs.
Woodcock Valley Cheese Fac-	L. C. Mead,	Saegertown. tory.

MILK CONDENSERIES

McJunkin-Straight Dairy Co., E. C. Meech, Mgr.,	Saegertown.
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CANNERIES

Springboro Cannery,	Fred W. Thornton, Mgr., ...	Springboro.
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CUMBERLAND COUNTY

CREAMERIES

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Bridgewater Creamery,	Joseph F. Hoover, Sec.,	Newville, R. D. No. 4.
Farmers' Creamery,		Newburg.
Farmers' Co-operative Crmy. Co.,		Newville, R. D. No. 3.
Grantham Station Creamery,	Peter Hernig, Mgr.,	2007 Mascher St., Philadelphia.
Heberlig Creamery,	J. A. Brandt, Mgr.,	Newville, R. D. No. 4.
Lees X Roads Creamery,	William Kelly & Sons,	Philadelphia.
Longsdorf Creamery,	William Kelly & Sons,	Longsdorf.
Mechanicsburg Creamery,	M. R. Nissley,	Mechanicsburg.
Mooredale Creamery,	Penna. Milk Products Co.,	Carlisle, R. D. No. 5.
Mount Rock Creamery,	Martin Nissley & Co.,	Newville, R. D. No. 4.
New Kingston Creamery,	John C. Armstrong,	New Kingston.
Pennsylvania Milk Products Co.,	A. A. Aughinbaugh, Pres.,	Shippensburg.
Pennsylvania Milk Products Co.,	B. A. Cramer, Mgr.,	Oakville.
Pennsylvania Milk Products Co.,	M. R. Nissley, Mgr.,	Newville.
Plainfield Creamery,	Martin Nissley & Co.,	Mechanicsburg.
Reading Dairy Co.,	S. J. Frehm, Mgr.,	Barnits.
Strohm's Creamery,	W. A. Strohm,	Newburg.
William Grove Creamery,	Penna. Milk Products Co.,	Harrisburg.

MILK CONDENSERIES

Pennsylvania Milk Products Co.,	M. R. Nissley, Mgr.,	Shippensburg.
Pennsylvania Milk Products Co.,	M. R. Nissley, Mgr.,	Newville.

CANNERIES

Grantham Preserving & Pickling Co.,	A. J. Rosenberg, Supt.,	Grantham.
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DAUPHIN COUNTY

CREAMERIES

Deodate Creamery,	J. Ezra Foltz,	Deodate.
Hershey Creamery Co.,	E. N. Hershey, Mgr.,	400 S. Cameron St., Harrisburg.

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Hoak's Dairy,	Charles A. Hoak,	Penbrook.
Millerstown Creamery,	William Kelly Co.,	Philadelphia.
Penna. Milk Products Co.,	M. R. Nissley, Mgr.,	2112 Atlas St., Harrisburg.
Stine's Creamery,	Peter E. Stine,	Elizabethville, R. D. No. 1.

DELAWARE COUNTY

CREAMERIES

Darlington Creamery,	J. & J. Darlington,	Darling.	
Gradyville Creamery,	N. & H. P. Howard,	Gradyville.	
Harvey's Creamery,	P. E. Sharpless Co.,	Brandywine Summit, R. D.	Sum-
Heyburn Creamery,	Harry H. Heyburn,	Brandywine Summit.	Sum-
Sharpless Creamery,	P. E. Sharpless Co.,	Ward.	

CHEESE FACTORIES.

P. E. Sharpless & Co.,	P. E. Sharpless,	819 N. 11th St., Philadelphia.
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MILK CONDENSERIES

.....	A. Harvey & Sons,	Brandywine Summit.	Sum-
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ELK COUNTY

CREAMERIES

Hyde's Creamery Co.,	H. R. Hyde,	Ridgway.
St. Mary's Creamery,	Sweeney Brothers,	St. Marys.
Ridgway Pure Milk Co.,	H. Park, Pres.,	Ridgway.

ERIE COUNTY

CREAMERIES

Arbuckle Creamery,	J. J. Ashton,	Union City, R. D. No. 1.
Canadahta Creamery,	Penn Distributing Co.,	Union City.
Cottage Hill Creamery,	Glenn Kappel,	Union City, R. D.

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Economy Creamery,	W. B. Alward,	Edinboro.
Edinboro Creamery,	Breakstone Brothers,	344 Greenwich St., New York, N. Y.
Edinboro Creamery,	Theo. Lewis, Mgr.,	Edinboro.
Hatch Hollow Creamery,	W. D. Steadman,	Union City, R. D. No. 7.
Lovello Creamery,	William Akam,	Corry, R. D. No. 3.
McLallen's Corners Crmy., ...	Charles Fraley & Son,	Mill Village.
Mill Village Creamery,	Charles Fraley & Son,	Mill Village.
Penn Distributing Co.,		Union City.
Tillen Creamery,	C. D. Faulkner & Son,	Corry, R. D.
Waterford Creamery,	Wells & Hewitt,	Waterford.
Wattsburg Creamery,	Sears Brothers,	Wattsburg.
Wells Creamery,	George F. Wells,	Waterford.

CHEESE FACTORIES

Ashton Corners Cheese Fac- tory,	L. B. Weaver,	North East, R. D. No. 3.
Erie County Milk Assoc.,	C. F. Sweet, Supt.,	Erie.
LeBoeuff Cheese Factory,	W. S. Wheeler, Mgr.,	North East.
McLane Cheese Factory,	Daniel Long,	McLane.
Mystic Cheese Factory,	J. H. Waterhouse,	Cambridge Springs.
Waterford Cheese Factory,	Charles Bookwood,	Waterford.
West Union Cheese Factory, ..	O. W. Carroll,	Union City.

MILK CONDENSERIES

Merrill-Soule Co.,	F. D. Parker, Supt.,	Union City.
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CANNERIES

North East Preserving Works, .	J. M. McLaughlin,	North East.
Pure Food Cannery,	A. M. Thomas & Son,	Erie, R. D. No. 2.
Wigton Farm Cannery,	R. H. Marsh, Supt.,	Avonia.

FRANKLIN COUNTY

CREAMERIES

Altenwald Creamery Co.,	C. E. Hollinger, Mgr.,	Altenwald.
Blue Mountain Creamery, ...	C. D. Nelson, Mgr.,	Waynesboro.
Cumberland Valley Creamery & Dairy Co.,	H. H. Fogelsanger, Mgr., ...	Chambersburg.
Corner Creamery,	S. W. Yingling,	Welsh Run.
Dry Run Creamery,	James McCurdy,	Willow Hill.
Fort Loudon Creamery,	Joseph S. Rotz,	Fort Loudon.
Hershey Condensing Co.,	William T. Williamson, Mgr., .	Williamson.
Lemaster Creamery,	Seth Lemaster,	Marks.

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Lemaster Station Creamery, ..	D. M. Keller,	Lemasters.
Long's Station Farmers' Co-operative Creamery Assoc., ..	William Hagerman,	Milnor.
Mercersburg Creamery,	D. M. Keller, Mgr.,	Mercersburg.
Montgomery Co-operative Creamery Co.	S. A. Shartle, Pres.,	Mercersburg, R. 1) No. 1.
Mountain Valley Dairy & Produce Co., Ltd.	F. H. Shearer, Mgr.,	Concord.
Mowersville Creamery,	I. S. Hollar, Mgr.,	Mowersville.
Myers & Ryder Creamery,	Myers & Ryder,	Mercersburg, R 1) No. 2.
Welsh Run Creamery,	S. W. Yingling, Supt.,	Greencastle.
Williamson Creamery,	S. E. Phiel,	Williamson.
Willow Hill Creamery,	James McCurdy,	Willow Hill.

MILK CONDENSERIES

C. V. Creamery & Dairy Co., ..R. H. Fogelsanger,Chambersburg.

FULTON COUNTY

CREAMERIES

Grissinger Creamery,Hershey Creamery Co.,Harrisburg.

GREENE COUNTY

CREAMERIES

Riverside Creamery,B. F. Gabbler & Son,Greensboro.

INDIANA COUNTY

CREAMERIES

Marion Center Butter Supply.....Marion Center.
Co.
Marion Center Co-operative Hon. H. J. Thompson, Pres., Marion Center.
Creamery Co.
The Home Creamery,E. S. Fontaine, Owner,Home.

JUNIATA COUNTY

CREAMERIES

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Academia Creamery,	T. K. Beaver, Sec.,	Academia.
Farmers' Creamery,	Charles E. Schell, Sec.,	McAllisterville.
McCoysville Creamery,	Breyer Ice Cream Co.,	Port Royal.
Mexico Co-operative Army. Co.,	Kelly Brothers,	Philadelphia.
Mifflin Creamery Co.,	J. W. Gaul, Supt.,	Mifflintown.
Thompstontown Creamery,	Charles Zigler,	Thompstontown.
Walnut Creamery,	F. P. Harns,	Walnut.

MILK CONDENSERIES

Port Royal Milk Condensery, ..Breyer Ice Cream Co., (Phila.)Port Royal.

LACKAWANNA COUNTY

CREAMERIES

Abington Dairy Creamery,	Abington Dairy Co.,	322 Linden Street, Scranton.
Crest Farm Dairy,	E. J. Northup,	210 Linden Street, Scranton.
Enderly Dairy Creamery,	William Conrad,	Moscow.
Lakeview Dairy & Produce Co.,	Dewilton Sweet, Sec.,	Fleetville.
Ltd.		
Slocum Milk Depot,	F. E. Slocum,	Dickson City.

LANCASTER COUNTY

CREAMERIES

Akron Creamery,	Samuel Rettew, Mgr.,	Ephrata.
Arcadia Creamery,	Abbott Dairy Co.,	Fulton House.
Bartville Creamery,	Abbott's Alderney Dairies,	Bartville.
Bradley's Mills Creamery,	Turner Westcott,	Peterscreek.
Branch Farmers' Creamery, ..	Harvey Miller, Mgr.,	Mt. Joy, B. D. No. 4.
Cocalico Creamery,	W. H. Penny,	Reinholds, R. D. No. 2.
Dyson's Creamery,	Nelson Dyson,	New Providence.
Eberly's Creamery,	H. E. Eberly,	Denver.
Elam Creamery,	George Abbott,	Little Britain.
Elstonville Creamery,	Hershey Chocolate Co.,	Hershey.

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Fairmount Creamery,	George Abbott,	Fairmount.
Fairview Creamery,	Morris R. Darlington,	Gap.
Farmers' Co-operative Crmy.,	George Abbott & Co.,	Quarryville.
Farmers' Creamery Co.,	Benj. O. Musser, Supt.	Mt. Joy.
Frysville Creamery,	John Fry's Sons,	Ephrata.
Gap Creamery,	E. R. Powell,	Gap.
.....	E. L. Garber & Son,	Lititz.
Georgetown Creamery,	A. J. Roberts,	Bart.
Givler's Creamery,	Daniel Givler,	Denver.
Goshen Creamery,	Abbott Dairy Co.,	Fulton House.
Hershey Creamery,	P. N. Hershey,	Lebanon.
Hess Creamery,	Hershey Chocolate Co.,	Hershey.
Intercourse Creamery,	E. K. Delinger Prop.,	Intercourse.
Lancaster Junction,	Reading Dairy Co.,	Manheim, R. D No. 2.
Kirkwood Dairy & Produce Co.,	Cyrus G. Barr, Mgr.,	Kirkwood. Ltd
Kreider's Creamery,	B. O. Musser,	Mt. Joy.
Lancaster Creamery Co.,	William C. Bidlack, Mgr., ..	Lancaster.
Landisville Creamery,	Levi H. Hershey,	Landisville.
Manheim Creamery,	Hershey Chocolate Co.,	Hershey.
Mastersonville Creamery,	Hershey Chocolate Co.,	Hershey.
Mount Pleasant Creamery,	F. J. Trout,	Quarryville, R. D. No. 5.
Nine Points Creamery,	W. P. Roberts,	Nine Points.
Reading Dairy Co.,	W. S. Sweigart, Mgr.,	Commonwealth Bldg., Phila.
Silver Spring Creamery,	Silver Spring Dairy Co.,	Holtwood.
Smyrna Creamery,	R. E. Powell,	Smyra.
Springville Creamery,	M. R. Darlington,	Springville.
Walters Creamery,	Jerome Walter & Co.,	Reinholds, R. D. No. 2.
West Brook Dairy & Produce	Edgar Kirk, Pres.,	Peters Creek. Co., Ltd.
Whiteoak Creamery,	Hershey Chocolate Co.,	Hershey.
White Rock Creamery,	George Abbott,	White Oak.

MILK CONDENSERIES

.....E. L. Garber & Co.,Lititz.

CANNERIES

Peach Bottom Cannery,William Finney,Bell Air, Md.
West Prook Cannery,William P. King,Peach Bottom, R.
D.

LAWRENCE COUNTY

CREAMERIES.

Energy Creamery,Harvey L. Palmer,New Castle, R. D.
No. 1.
Enon Valley Creamery,Edward E. Reick Co.,Pittsburgh.

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Golden Dale Creamery,	O. D. Ott, Mgr.,	Edinburgh, R. D. No. 2.
Home Creamery,	G. W. McNally, Owner,	16 S. Jefferson St., New Castle.
Ideal Creamery,	R. S. Mercer,	New Wilmington.
Mt. Air Butter Co.,	C. Rockford Sprenkle, Supt., ..	Enon Valley.

LEBANON COUNTY

CREAMERIES.

Brownback Creamery,	Milton Yeager, Supt.,	Myerstown, R. D.
Fredericksburg Creamery,	Hershey Chocolate Co.,	Hershey.
Greenville Creamery,	Aaron Walner,	Myerstown, R. D. No. 1.
Harper's Creamery,	Hershey Chocolate Co.,	Hershey.
Jonestown Creamery,	Hershey,	Jonestown.
Lemberger's Creamery,	Jacob Wolf,	Grantville, R. D.
Millbach Springs Creamery, ..	D. W. Brown, Supt.,	Newmanstown, R. D. No. 2.
Ono Creamery,	Hershey Chocolate Co.,	Hershey.
Palmyra Creamery,	David Sanders,	Palmyra.
Reading Dairy Co.,	F. N. Leidig, Supt.,	Sheridan.
Water Works Creamery,	Jacob Wolf,	Annville, R. D. No 2.
Yost Creamery,	S. T. Yost,	Myerstown.
Zug Creamery,	Ephraim Zug,	Prescott.

LEHIGH COUNTY

CREAMERIES.

Coopersburg Creamery,	Charles D. Steininger,	Coopersburg.
Faust's Creamery,	Peter J. Faust,	Zionsville, R. D. No. 1.
Fogelsville Creamery,	E. M. Loux,	Fogelsville.
Hosensack Creamery,	John M. Roeder,	Hosensack.
Lanark Creamery,	Robert W. Schaffer,	Lanark.
Laury's Creamery,	Stewart & Long,	Laury's Station.
Limeport Creamery,	H. H. Trumbauer,	Limeport.
Loux Creamery Co.,	William Acker, Supt.,	Macungie.
Loux Creamery,	Loux Creamery Co.,	Trexlerstown.
Plover Creamery,	R. H. Fegely,	Limeport.
Steinsville Creamery,	William H. Long, Mgr.,	Steinsville.
Vern Cruz Creamery,	Horace M. Schantz,	Vera Cruz.

LUZERNE COUNTY

CREAMERIES

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Drumheller's Creamery,	Howard Drumheller,	Sybertsville.
Hobbie Co-operative Creamery Association.	Theodore Niering, Mgr.,	Wapwallopen, R. D. No. 3.
Klinger's Creamery,	William H. Klinger,	Sugarloaf, R. D.
Millville Creamery,	J. A. Echman, Mgr.,	Sambra.
Millville Creamery,	William Eckman,	Millville.

CANNERIES

Conyngham Cannery,	Klinger Brothers,	Conyngham.
The Garrahan Canning Co., ...	M. Garrahan & Son,	Luzerne.

LYCOMING COUNTY

CREAMERIES

Jersey Shore Creamery,	Edward Wood,	Jersey Shore.
Montoursville Creamery Co., ...	Charles R. Evans, Sec.,	Montoursville.
Muncy Creamery Co.,	Fred Lauer, Prop.,	Muncy.
White Deer Valley Dairy & Co-operative Produce Co.	Montgomery, R. D.

CHEESE FACTORIES

Whitepine Cheese Factory,	E. B. Ayres,	Whitepine.
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CANNERIES

Pennsdale Cannery,	George Fry,	Pennsdale.
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McKEAN COUNTY

CREAMERIES

Numundah Creamery,	A. B. Armstrong,	Smethport.
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CHEESE FACTORIES

Annin Creek Cheese Factory, ...	J. E. Case,	Turtle Point.
Bell Run Cheese Factory,	F. O. Bosworth,	Ceres, N. Y.
Ceres Cheese Factory,	Fred Gleason,	Ceres, N. Y.
Corryville Cheese Factory,	L. W. Howden,	Corryville.
Crosby Cheese Factory,	J. E. Case,	Crosby.

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Duke Centre Cheese Factory,	Arthur Prentiss, Mgr.,	Duke Centre.
Eldred Cheese Factory,	A. B. Neff,	Eldred.
Kasson Cheese Factory,	L. W. Howden,	Coryville.
Myrtle Cheese Factory,	L. W. Murdock,	Rexville.
Newell Creek Cheese Factory,	A. B. Neff,	Eldred.
Port Allegany Cheese Factory,	J. E. Case,	Turtle Point.
Turtle Point Cheese Factory,	J. E. Case,	Turtle Point.
Two Mile Cheese Factory,	J. E. Case,	Crosby.
Wrights Cheese Factory,	W. E. Sawyer,	Wrights.

MERCER COUNTY

CREAMERIES

Biggins Creamery,	J. W. Biggins Sons' Co.,	Sharon.
Hadley Creamery Co.,	Butler Pure Milk Co.,	Hadley.

CHEESE FACTORIES

Horne Cheese Co.,	H. E. Horne,	Greenville
Shenkleysville Cheese Factory,	A. W. Wall,	Sheakleysville.

MILK CONDENSERIES

Jamestown Condensery,	P. Garretson, Mgr.,	Jamestown.
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MIFFLIN COUNTY

CREAMERIES

Belleville Creamery,	Abner Y. Detweiler,	Belleville.
Belleville Creamery,	F. W. Warner, Supt.,	Belleville.
Milroy Creamery,	Milroy Creamery Co.,	Milroy.

MONROE COUNTY

CREAMERIES

Sciota Creamery,	Wisner & Black,	Sciota.
Stroudsburg Creamery Co.,	Detrick Brothers,	Stroudsburg.
Wagner's Creamery,	William H. Wagner,	Kresgeville.
Weir's Lake Creamery,	F. D. Shupp,	Gilberts.
Weir's Lake Creamery,	F. D. Shupp, Mgr.,	Brondheads ville.

MONTGOMERY COUNTY

CREAMERIES

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Branch Valley Creamery,	H. F. Musselman,	Telford.
Buridan's Creamery,	Buridan Brothers,	Pottstown.
Children's Village Creamery, ..	O. D. Lockwood, Supt.,	Meadowbrook.
Drake's Corner Creamery,	Charles M. Hedrick,	Hatfield, R. D. No. 1.
East Greenville Creamery,	Adam Krauss,	East Greenville.
Excelsior Creamery,	G. E. Brownback,	Pottstown, R. D.
Fairview Village Creamery	H. B. Warsetler, Supt.,	Fairview Village Association.
Farmers' Creamery Assoc.,	E. A. Heebner,	Worcester
Gilbertsville Creamery,	E. A. Lesiter, Mgr.,	Gilbertsville.
Graterford Creamery,	Samuel Koons,	Graterford.
Green Tree Creamery,	William Keiser,	Obelisk.
Harleyville Creamery,	M. C. Clemens,	Harleyville.
Hillegass Creamery,	John S. Weiss,	Pennsburg, R. D. No. 2.
Lansdale Pure Food Co.,	William E. Morris,	Lansdale.
Lederach Creamery,	Milton E. Alderfer,	Schwenkville, R. D. No. 1.
Mainland Creamery,	Richard S. Hunsberger,	Mainland.
Markley's Creamery,	James Wise, Mgr.,	Pottstown.
Mingo Creamery,	A. G. Fry,	Royersford, R. D. No. 2.
Narcissa Creamery,	William R. Hendren,	Norristown, R. D. No. 4.
Niantic Creamery,	Jonathan W. Moser,	Niantic.
Perkiomenville Creamery,	John A. Moll,	Perkiomenville.
Prospectville Creamery,	John S. Holly,	Prospectville.
Salfordsville Creamery,	Manasses Clemens,	Salfordsville.
Sanatoga Creamery Assoc., ..	I. H. Rhoads, Mgr.,	Pottstown, R. D. No. 4.
Sassamansville Creamery,	William M. Moyer, Mgr.,	Sassamansville.
Schwenkville Creamery,	William Unger,	Schwenkville.
Towamensing Creamery,	S. S. Brown & Co.,	Lansdale, R. D. No. 1.
Woxall Creamery,	J. Benner,	Woxall.

CHEESE FACTORIES

Holly Brothers' Cheese Fac-	Theo. Holly,	Souderton.
tory.		
Rosenberger Cheese Factory, ..	William W. Rosenberger,	Souderton.

CANNERIES

.....	Samuel Dewees,	Pottstown, R. D. No. 6.
Lansdale Pure Food Co.,	Wm. E. Morris, Mgr.,	Lansdale.

MONTGOMERY COUNTY

CREAMERIES

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Strawberry Ridge Creamery,	H. A. Snyder, Mgr.,	Strawberry Ridge.

NORTHAMPTON COUNTY

CREAMERIES

Achenbach's Creamery,	A. F. Finkberner,	Askermanville.
Bingen Creamery,	Charles H. Dimmig,	Bingen.
Butztown Creamery,	John C. Noll,	Butztown.
Centreville Creamery,	H. C. Hurley,	Stone Church.
Derhone's Creamery,	John T. Derhone,	Bath, R. D. No. 2.
Edelman Creamery,	Gerhart & Pagels,	Nazareth, R. D. No. 2.
Finkbeiner Creamery,	Richard Johnson,	Mt. Bethel.
Hanerville Creamery,	William A. Scott,	Siegfried.
Hecktown Creamery,	William H. Meyers,	Bethlehem, R. D. No. 1.
Howertown Creamery,	William H. Kleppinger,	Siegfried, R. D. No. 1.
Ironville Creamery,	Malon O. Johnson,	Hellertown, R. D. No. 2.
Kreidersville Creamery,	Zenas A. Solt,	Siegfried.
Kreidersville Creamery,	Zenas A. Solt,	Northampton, R. D. No. 1.
Lower Hill Creamery,	David A. Rot,	Wind Gap, R. D. No. 1.
Moorestown Creamery,	Gerhart & Pagels,	Nazareth, R. D. No. 2.
Nazareth Creamery,	James Moyer, Mgr.,	Nazareth.
Petersville Creamery,	William A. Solt,	Siegfried, R. D. No. 1.
Petersville & Howersville Creamery,	Zenas A. Solt,	Northampton, R. D. No. 1.
Supplee Alderney Creamery,	Supplee Brothers,	Philadelphia.

CHEESE FACTORIES

Wagner Farm Dairy,	Tony Carroccio,	Easton, R. D. No. 1.
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CANNERIES

Dairy Cannery,	W. A. Endy,	Bethlehem, R. D. No. 2.
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NORTHUMBERLAND COUNTY

CREAMERIES

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Dewart Creamery,	Charles F. Sheffer,	Dewart.
Pleasant Valley Creamery Co.,	W. A. Heinen,	Milton.

PERRY COUNTY

CREAMERIES

Cold Spring Creamery,	Dickenson, Gilbert & Keen, ...	Lordsville.
Farmers' Creamery Co.,	S. B. Swartz, Mgr,	Elliottsburg.
Farmers' Elgin Creamery,	Farmers' Company,	Elliottsburg.
Liverpool Creamery,	Breyer Ice Cream Co.,	Port Royal.
Millerstown Creamery,	William Kelly & Sons,	Philadelphia.

PHILADELPHIA COUNTY

CHEESE FACTORIES

Kennedy Cheese Factory,	S. R. & S. W. Kennedy,	28 S. Water Street, Philadelphia.
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CANNERIES

R. C. Chance's Sons,	Robert C. Chance,	122-124 Pine Street, Philadelphia.
Heyl Brothers' Co.,	William A. Koenig,	101 S. Front Street, Philadelphia.
Philadelphia Pickling Co.,		Philadelphia.
P. J. Ritter Conserve Co.,	Wm. H. Ritter, Treas.,	Philadelphia.

POTTER COUNTY

CREAMERIES

Crystal Creamery,	William Woodward,	Millport.
Eleven Mile Creamery,	Thomas Hart,	Genesee.
Millport Creamery,	Willis Clark,	Millport.

CHEESE FACTORIES

Burtville Cheese Factory,	C. H. Ellis,	Burtville.
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<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Crittenden Cheese Factory,	Ross Scott, Mgr.,	Oswayo.
Gold Cheese Factory,	C. J. Conable,	Gold.
Roulette Cheese Factory,	John Case,	Turtlepoint.
Ulysses Cheese Factory,	F. A. Millett,	Ulysses.

MILK CONDENSERIES

Rose Dairy Co.,	Fred Rose,	Wellsboro
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SNYDER COUNTY

CREAMERIES

Beaver Spring Creamery,	David T. Spaid,	Beaver Springs.
Cold Spring Creamery,	D. E. Hagerman,	Mt. Pleasant Mills.

SOMERSET COUNTY

CREAMERIES

Crystal Spring Creamery,	A. C. Floto,	Berlin.
I. X. L. Creamery,	R. I. Pile,	Friedens.
The Dicksdale Creamery,	H. W. Walker & Co.,	Somerset.

SULLIVAN COUNTY

CREAMERIES

Dushore Creamery,	Maurice Harrington,	Dushore.
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SUSQUEHANNA COUNTY

CREAMERIES

Auburn Center Creamery,	Co-operative,	Meshoppen, R. D. No. 1.
Auburn Four Corners Crmy.,...	J. Q. Adams, Treas.,	Auburn Four Corners.
Baker Creamery,	Co-operative,	Meshoppen, R. D. No. 4.

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address</i>
Baldwin's Creamery,	Silas Baldwin,	Uniondale.
Borden's Creamery,	D. D. More, Mgr.,	Montrose.
Brooklyn Creamery,	Harford Dairy Co.,	Brooklyn.
Central Dairy Co.,	Floyd Ball, Mgr.,	Montrose.
Choconut Valley Creamery, ...	T. F. Donnelly, Mgr.,	Choconut.
Clifford Creamery,	E. E. Finn, Mgr.,	Clifford.
Diamond Dairy Co.,	Diamond Dairy Co.,	Heart Lake.
Diamond Dairy Co.,	John Valentine, Supt.,	Susquehanna.
Dimock Creamery,	D. W. Stark,	Dimock.
East Rush Creamery,	E. W. Estus, Supt.,	East Rush.
Elk Lake Creamery Co., Ltd.,	Milton Biesecker,	Elk Lake.
Excelsor Creamery,	H. Fred Birchard, Sec.,	Birchardville.
Fairdale Creamery Co., Ltd.,	R. Devine, Mgr.,	Fairdale.
Fairdale Creamery,	W. E. Sterling, Sec.,	Montrose, R. D. No. 2.
Friendsville Creamery,	Co-operative,	Friendsville.
Forest Lake Creamery,	S. E. Wright, Sec.,	Forest Lake.
Gelatt Creamery,	Gelatt Dairy Co.,	Gelatt.
Gibson Creamery,	Gibson Dairy Assoc.,	Gibson.
Great Bend Creamery,	Samuel Fieldman,	618 E. 9th St., New York City.
Harford Dairy Co.,	E. E. Jones,	Harford.
Heart Lake Creamery,	Diamond Dairy Co.,	Heart Lake.
Farmers' Creamery, .....	.....	Hop Bottom.
Hop Bottom Creamery,	High Ground Dairy Co.,	Hop Bottom.
Hudson Milk & Cream Co., ...	R. R. McDonald,	New Milford, R. D. No. 3.
Jersey Hill Creamery,	Peter Mayne,	Rushboro.
Jersey Milk & Cream Co., ...	Sherman Hunter, Mgr.,	New Milford.
Kingsley Creamery,	R. F. Stevens,	West Auburn.
Lawton Creamery,	West Auburn Creamery Co., ..	Kingsley.
Lawsville Center Creamery, ..	James P. Downs, Pres.,	Lawsville.
Little Meadows Creamery,	Hicks & Collins,	Little Meadows.
McDermott Dairy Co.,	Andrew J. McDermott, Owner,	91 Manhattan St., New York City.
Quaker Lake Creamery,	Co-operative,	Brackney.
Richmond Hill Creamery,	T. J. Davies Estate,	Montrose.
Rush Creamery,	G. L. Pickett, Pres.,	Rush.
Rushville Creamery,	West Auburn Creamery Co., ..	West Auburn.
Shannon Hill Creamery,	C. H. Carpenter,	West Auburn.
South Auburn Creamery,	Bradford County Creamery	Laceyville. Co.
South Auburn Creamery,	Horseheads Creamery Co., ...	Meshoppen, R. D. No. 2.
South Gibson Creamery,	Harford Dairy Co.,	Harford.
The Stevens Point Crmy., ...	The Stevens Point Crmy. Co.,	Stevens Point.
West Auburn Creamery,	Albert Posinger, Mgr.,	West Auburn.
Woodlawn Dairy Co.,	John Jones & Sons,	Herrick Center.
McDermott Dairy Co.,	Andrew J. McDermott, Owner,	91 Manhattan St., New York City.

TIOGA COUNTY

CREAMERIES

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Canoe Camp Creamery,	Charles Johnson, Pres.,	Canoe Camp.
Chardavoyne Creamery,	H. S. Chardavoyne,	Tioga.
Elk Run Creamery Co., Ltd.,	D. O. Secoe, Mgr.,	Gaines, Rt. D. No 1.
Jackson Center Creamery Co.,	E. S. Everitt, Pres.,	Trowbridge.
Knoxville Creamery,	Penna Creamery Co.,	Knoxville
Liberty Valley Creamery,	R. A. Decoursey, Sec.,	Liberty.
Mainesburg Creamery,	Tioga County Creamery Co., ..	Mansfield.
Sayre Creamery,	Sayre Creamery & Cold Stor-	Nelson.
	age Co.	

CHEESE FACTORIES

Covington Cheese Factory,	W. D. Rose,	Mansfield
Hammond Cheese Co.,	William Kimball, Pres.,	Tioga.
Jobs Corners Cheese Factory, ..	William H. Carpenter,	Secley Creek, N. Y.
Kenneysville Cheese Factory, ..	W. D. Rose,	Mansfield.
Mitchells Mills Cheese Factory, J. B. Smith, Sec.,		Lawrenceville.
Morris Township Cheese Fac-	W. D. Rose,	Mansfield.
tory.		

UNION COUNTY

CREAMERIES

Diamond Dairy Co.,	W. H. Lewis, Mgr.,	Brooklyn, N. Y.
New Berlin Creamery,	F. H. Maurer,	New Berlin.

MILK CONDENSERIES

Lewisburg Condensery,	Naris Irey, Mgr.,	Lewisburg.
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CANNERIES

McKissick Cannery,	E. E. McKissick,	Hartleton.
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WARREN COUNTY

CREAMERIES

Acme Creamery,	G. A. Russell,	Sugargrove.
Cold Spring Creamery,	G. B. Whitcomb,	Chandlers Valley.
Corydon Creamery,	S. C. McClintock, Mgr.,	Corydon.

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
East Branch Creamery,	James Bennett, Supt.,	Spartansburg, R. D. No. 84.
Elk Creamery,	A. Birt,	Russell.
Garland Creamery,	I. D. Ramsdell,	Garland.
Grand Valley Creamery,	Jack Ramsdell,	Grand Valley.
Lander Creamery,	Charles G. Babcock,	Russell, R. D. No. 2.
Maple Place Creamery,	Martin E. Cowles,	Sugargrove, R. D. No. 4.
Sayre Creamery & Cold Storage Co.	Pennsylvania Creamery Co.,	Columbus.
Sayre Creamery,	Sayre Creamery & Cold Storage Co.,	Columbus.
State Line Creamery,	Lake Shore Ice Cream Co.,	Erie.
Walker Ice Cream Co.,	M. D. Wheeler, Sec.,	Warren.
Willowdale Co-operative Creamery Assoc.,	B. D. Bates, Pres.,	Spring Creek.

CHEESE FACTORIES

Dugall Cheese Factory,	Melvin Sandburg,	Pittsfield.
Lottsville Cheese Factory,	C. L. Chapin, Prop.,	Lottsville.
Sanford Cheese Factory,	F. W. Engle,	Grand Valley, R. D. No. 2.
Walker Ice Cream Co.,	M. D. Wheeler, Sec.,	Warren.

WAYNE COUNTY

CREAMERIES

Aldenville Creamery,	G. Smith & Sons,	Seelyville.
Arlington Creamery,	Arlington Creamery Co., Ltd.,	Arlington.
Borden Creamery,	Borden Cream Co.,	Lakewood.
Borden Company,	W. H. Curtis, Supt.,	Honesdale.
Clemons Creamery,	Mrs. Louisa Stahl,	Clemons.
Clinton Creamery Co.,	Frank Turner,	Aldenville.
Crystal Spring Creamery,	G. Smith & Sons,	Honesdale, R. D. No. 1.
Fallsdale Creamery Co., Inc.,	George J. Knorr, Sec.,	Fallsdale.
Galilee Creamery,	Sullivan County Crmy. Co.,	Jeffersonville, N. Y.
High Lake Elgin Creamery Co-operative Co.,	.....	Lakewood, R. D. No. 1.
Lake Ariel Creamery,	Sautora & Lambardi,	Ariel.
Lookout Creamery,	Sullivan County Crmy. Co.,	Jeffersonville, N. Y.
Lackawaxen Creamery,	R. H. Clift, Mgr.,	Prompton.
Newfoundland Creamery,	Frank Fetherman,	Newfoundland.
Niagara Creamery Co.,	W. S. Bigelow, Mgr.,	Pleasant Mount.
Orson Creamery,	Mutual Milk & Cream Co.,	New York City.
Pine Mill Creamery,	A. J. Parsons, Mgr.,	Equinunk.
Poyntelle Creamery,	Jos. O'Neill & Son,	503 W. 38th St., New York City.
Preston Park Creamery,	Mutual Milk & Cream Co.,	New York City.

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Rileyville Creamery Co.,	C. I. Hopkins,	Rileyville.
Spring Brook Creamery,	E. W. Gammell, Mgr.,	Honesdale, R. D No. 1.
Starrucca Creamery,	Starrucca Dairy Assoc.,	Starrucca.
Sterling Creamery,	Frank Fetherman,	Sterling.
Sullivan County Crmy. Co., ..	Roy Ellerson, Mgr.,	Galilee.
Waymart Creamery,	W. W. Pierson,	Waymart.
Waymart Creamery Co.,	D. W. Hull,	Waymart.
White's Valley Creamery,	G. Smith's Sons,	White's Valley.

CHEESE FACTORIES

Crystal Springs Crmy. Co., ...	G. Smith & Son,	Seelyville.
Rileyville Creamery Co.,	C. I. Hopkins,	Rileyville.
Striano Cheese Factory,	Carminé Striano,	Honesdale.

WYOMING COUNTY

CREAMERIES

Bradford County Creamery Co.,	F. C. Harris,	Laceyville.
Caryl Station Creamery,	Diamond Dairy Co.,	Factoryville, R. D. No. 1.
Center Moreland Crmy. Co., ..	William Baldwin,	Centre Moreland.
Crest Farm Dairy,	F. S. Gardner, Supt.,	201 Linden Street, Scranton.
Jenningsville Creamery,	Fred Bennett,	Laceyville, R. D. No. 5.
Jersey Milk & Cream Co.,	W. H. Mason, Mgr.,	Lemon.
Laceyville Creamery,	Bradford County Crmy. Co., ..	Laceyville.
Mehoopany Creamery,	H. A. Allen,	Mehoopany.
Meshoppen Creamery,	Farmers' Dairy Co.,	Meshoppen.
Nicosia Brothers' Creamery, ..	Nicosia Brothers,	Nicholson.
Tunkhannock Creamery,	H. A. Rush,	230 Stockholm St., Brooklyn, N. Y.
Vosburg Creamery,	D. W. Stark,	Vosburg.

YORK COUNTY

CREAMERIES

Bonnair Creamery,	W. A. Bubbs,	Glen Rock, R. D. No. 1.
Brodbeck's Creamery,	S. B. Brodbecks,	Brodbecks.
Bryansville Creamery,	Isaac Ruff,	Delta, R. D. No. 2.
C. V. Creamery,	W. E. Wiley,	Mt. Top.
Clear Spring Creamery,	George W. Dick,	Clear Spring.

<i>Name.</i>	<i>Owner, Supt. or Mgr.</i>	<i>Address.</i>
Cool Spring Creamery,	W. R. Galbreath,	Slate Hill.
Dover Creamery,	Calvin F. Hoffman,	Dover.
Gatchelville Creamery,	John P. Kunkel,	Bridgeton, R. D. No. 1.
Hanover Creamery Co.,	H. M. Stokes, Mgr.,	Hanover.
Helb's Creamery,	Edward Helb,	Railroad.
Keystone Creamery,	C. D. Hoffman,	Dover.
LaBott Creamery,	Frank Eyster,	Thomasville, R. D. No. 1.
Nace's Creamery,	Elias E. Nace,	Hanover, R. D. No. 3.
New Park Creamery,	Joseph A. Gailey,	New Park
Siple's Creamery,	Siples & Co.,	Dillsburg.
Spring Grove Creamery,	Samuel Swartz,	Spring Grove.
Stewartstown Creamery Co., S. T. Church,		Stewartstown. Ltd.,
Sunnyburn Creamery,	Wiley Gemmill & Co.,	Sunnyburn.
Woodbine Creamery,	Roy Showalter,	Woodbine.
York Sanitary Milk Co.,	H. N. Forrey, Sec.,	York.

MILK CONDENSERIES

Hanover Creamery Co.,	H. M. Stokes, Mgr.,	Hanover.
York Sanitary Milk Co.,	H. N. Forrey, Sec.,	York.

CANNERIES

Airville Cannery,	C. C. Smith,	Airville.
Bridgeton Cannery,	R. B. Hyson,	Bridgeton.
Bryansville Cannery,	W. H. Myers & Co.,	Delta, R. D. No. 2.
Castle Fin Cannery,	T. T. Snyder, Mgr.,	Delta.
Codorus Canning Co.,	C. D. Sterner, Supt.,	Codorus.
Delta Canning Assoc.,	Joseph S. Whiteford,	Delta.
Farmers' Canning Co.,	George Myers, Supt.,	Red Lion.
Fawn Grove Cannery,	Smith & Colgan,	Fawn Grove.
Hershey Canning House,	P. H. Hershey,	Spring Grove.
High Rock Canning Co.,	H. C. Manifold, Mgr.,	High Rock.
.....	Jacob Myers,	Delta, R. D. No. 2
New Park Cannery,	Smith & Colgan,	New Park.
Peach Bottom Cannery,	T. T. Snyder,	Woodbine, R. D. No. 3
Slab Cannery,	Ira W. Chandlee,	Delta, R. D.
Stewartstown Cannery,	George W. Devilbiss,	Stewartstown.
Sunnyburn Cannery,	T. T. Snyder,	Sunnyburn.
Wylie Cannery,	James T. Smith,	Fawn Grove.
Winebrenner's Cannery,	D. E. Winebrenner Co.,	Hanover.
Woodbine Cannery,	H. M. Ruff,	Woodbine.
Zeigler's Cannery,	Hershey Brothers,	East Berlin.

From the Reports of the Pennsylvania Department of Agriculture. The following comparison of tables for the past ten years shows the prices of milk and butter in Pennsylvania.

TABLE OF COMPARISON.

	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914
Butter, per pound, at store,	.28	.28	.27	.27	.28	.28	.28	.28	.30	.31
Butter, per pound, at market,	.25	.27	.30	.30	.33	.31	.30	.33	.33	.33
Milk, wholesale, per 100 pounds,	1.30	1.50	1.50	1.30	1.40	1.60	1.50	1.50	1.60	1.63
Milk, retail, per quart, ....	.05	.06	.06	.06	.07	.07	.07	.07	.07	.07

From the Year book of the Department of Agriculture, Washington, D. C. Average price received for butter by farmers on the first of each month of 1914.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Pennsylvania,	.35	.34	.33	.30	.33	.36	.36	.37	.39	.31	.33	.34
Ohio, .....	.29	.28	.27	.25	.24	.22	.23	.24	.27	.27	.27	.28
Illinois, .....	.23	.23	.23	.25	.24	.23	.23	.23	.27	.27	.27	.28
Michigan, .....	.30	.29	.28	.26	.26	.23	.23	.24	.26	.27	.28	.29
Wisconsin, ....	.33	.33	.29	.27	.28	.25	.25	.27	.29	.30	.30	.31
Minnesota, ....	.31	.30	.27	.25	.24	.24	.23	.24	.27	.27	.28	.28
Iowa, .....	.29	.29	.26	.24	.24	.24	.24	.25	.26	.27	.27	.28

From Thirteenth United States Census. Butter, Cheese and Condensed Milk, 1900,
1904 and 1899.

State	Census.	Butter (pounds)	Cheese (pounds)	Condensed milk (pounds)
United States,	1900	624,764,653	311,126,317	494,796,544
	1904	581,478,141	317,144,373	305,485,183
	1899	430,126,546	281,972,234	186,321,787
Pennsylvania,	1900	30,484,217	11,234,087	28,461,384
	1904	26,754,841	11,453,434	20,384,700
	1899	27,137,161	10,267,448	2,862,000
Ohio,	1900	17,491,251	11,960,601	37,655,247
	1904	11,591,981	17,351,773	1,947,218
	1899	8,087,631	13,156,527	100,000
Illinois,	1900	24,570,976	4,799,235	114,500,748
	1904	27,330,925	5,301,211	93,425,052
	1899	24,055,313	9,055,119	71,237,449
Michigan,	1900	25,511,760	13,382,160	32,404,944
	1904	21,012,000	16,814,856	27,631,608
	1899	7,520,712	10,422,583	13,373,869
Wisconsin,	1900	108,884,684	143,045,648	30,573,886
	1904	89,155,975	109,428,856	11,514,222
	1899	61,513,508	77,748,680	3,466,516
Minnesota,	1900	63,842,846	3,735,333	.....
	1904	62,123,554	3,060,055	79,120
	1899	41,174,469	3,285,019	.....
Iowa,	1900	83,582,137	999,559	4,384,333
	1904	71,181,766	2,829,745
	1899	77,223,264	4,242,637

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DAIRY AND FOOD BUREAU

BULLETIN No. 272

TOMATO KETCHUPS

ANALYSES MADE BY
CHARLES H. LAWALL, *Chemist*
LEROY FORMAN, *Chemist*



CHAS. E. PATTON, *Secretary of Agriculture*

JAMES FOUST, *Dairy and Food Commissioner*

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PREFACE

In view of the great and growing consumption of Tomato Ketchup by the people of this country, the question of the wholesomeness of this product is of interest to every citizen. The following report, covering a wide range of Tomato Ketchup, such as are found in almost every family is, therefore, made, and authorized to be printed as a Bulletin of this Department for the information of the public.

CHAS. E. PATTON,
Secretary of Agriculture.



LETTER OF TRANSMITTAL.

Harrisburg, Pa., *December 1, 1915.*

Hon. CHAS E. PATTON, Secretary of Agriculture:

Dear Sir: I have the honor to submit herewith a report by Professor Charles H. LaWall, Chemist to the Dairy and Food Bureau of the Department of Agriculture, presenting the results of a recent investigation upon the quality, as respects conformity to the Food Act of May 13th, 1909, of the Tomato Ketchup sold in this Commonwealth. In view of the wide public interest in the subject, I recommend that it be published as a Bulletin of this Bureau.

I have the honor to remain,

Very respectfully,

JAMES FOUST,
Dairy and Food Commissioner.



TOMATO KETCHUP. •

BY CHARLES H. LAWALL AND LEROY FORMAN.

The word "ketchup," spelled also "catchup" and catsup," is of oriental origin, being found in the Malay language as *Kechap* or *Kejap*, applied to a sauce eaten with meat or fish and in the Chinese language as *Koe-chiap*, applied to the brine or liquor of pickled fish. The spelling, "ketchup," according to one of the Government Bulletins (Bulletin 119, Bureau of Chemistry, U. S. Dept. of Agriculture, Experiments on the Spoilage of Tomato Ketchup) is the form which should be given preference, as the spelling, "catchup," which is accorded the preference in some of the leading American dictionaries, seems to be based upon the erroneous idea that the syllable "ketch" is a colloquial form of "catch." There is no etymological warrant for the much used form "catsup."

Ketchup is a generic term applied to sauces made from mushrooms, walnuts or tomatoes, the last being the material most extensively used in the United States. The tomato is the fruit of a plant native to tropical South America, the Spanish name *Tomate* being undoubtedly derived by the early explorers from the Mexican word *Tomatl*.

It is an interesting fact, well known to older persons still living, that this important fruit or vegetable, for it plays the part of both in our culinary affairs, was long believed to be unfit for food and was cultivated as an ornamental plant in the United States until some time just prior to 1840, when it came into use gradually at first and then by leaps and bounds, so that at the present time it is one of the most popular vegetables supplied in the canned form, more than thirteen million dozen cans having been packed in one year (1910), this being exclusive of its use in soups, sauces, relishes and ketchup, or in the fresh condition in salads, etc. It is also of interest to note that the name "love apple," by which the fruit and the plant were formerly often known, came really from the Italian name *Pomo de Mori* or apple of Morocco, where it was early cultivated, corrupted by the French into *pomme d'amour*, whence our translation into love apple.

The composition of the tomato varies slightly, due to size, commercial variety and climatic conditions, and is approximately as follows:

Composition of the whole, unpeeled tomatoes:

Water,	from 91.30% to 96.30%
Fat,	from 0.05% to 0.25%
Protein,	from 0.30% to 1.30%
Sugars,	from 2.20% to 6.50%
Crude fibre,	from 0.50% to 1.20%
Ash,	from 0.30% to 0.80%
Acid (mainly citric)	from 0.25% to 0.75%
Coloring matter resembling carotin, undetermined.	

From these figures it will be seen that tomatoes are very low in nutritive value, containing only from 75 to 160 calories per lb. av. (2,500 calories being the average daily adult requirement) and are properly to be considered as an adjunct food or as a relish.

The use of tomatoes as a basis for the popular condiment called ketchup seems to be peculiar to the United States where the fruit has also attained its greatest popularity in the cooked form as a vegetable and in the raw condition as the basis of salads.

Tomato ketchup is one of the most widely used of American condiments and has enjoyed this popularity for many years past. It is therefore a matter of surprise that no mention whatever is made in the latest edition of the Encyclopedia Britannica of this use of the tomato in the article on the tomato, and the nine line article on "ketchup" in that famous work, merely mentions it in a list of other ketchups, stating that it is made from the *juice* of the tomato.

The definition of ketchup, according to the Committee on Standards of the American Association of Official Agricultural Chemists, is as follows:

"Ketchup is the clean, sound product made from the properly prepared pulp of clean, sound, fresh, ripe tomatoes, with spices and with or without sugar and vinegar."

Many investigations have been made of the tomato ketchups of commerce, both before and since the passage of the United States Food and Drugs Act of June 30, 1906. The most comprehensive and satisfactory investigations of this kind have been made by the Connecticut Agricultural Experiment Station and published in the Annual Reports of that Bureau. These reports may be taken as typical of existing conditions for the periods named.

In 1897 the Connecticut authorities reported the examination of 41 different brands, of which only 6 contained no preservative whatever, 27 contained salicylic acid and 8 contained benzoic acid (sodium benzoate). Practically all of the brands, which are now well known and widely advertised, were at that time being preserved with either

salicylic acid or benzoic acid and the majority were using the former, which is now prohibited by practically all food laws. No report was made of the coloring matter in these samples.

In 1901 the Connecticut authorities again reported the examination of a large number of brands of tomato ketchup. Out of 94 different brands examined only 10 were found to be free from chemical preservatives and coal tar color, 8 contained coal tar color but no preservative, while of the 76 preserved samples, 61 contained benzoic acid while 15 contained salicylic acid. These figures show that the manufacturers were voluntarily changing from the more harmful salicylic acid to the less harmful benzoic acid, for there was no national legislation on the subject and State laws were few and but indifferently enforced. Among those who had changed from salicylic acid to benzoic acid were most of the well known brands of to-day, but practically all of these were using coal tar color to give the bright red appearance thought necessary to catch the eye of the consuming public.

In 1904, just two years prior to the passage of the National Act, another investigation was made by the Connecticut Station, with the result that out of 66 brands of tomato catsup, not one sample was found to be free from both preservatives and artificial coloring matter. Of the 66 brands, 61 contained benzoic acid, 1 contained salicylic acid and 58 contained artificial color.

By this time it will be seen that salicylic acid had practically been abandoned by the manufacturers themselves, the brands having large interstate sales probably being stimulated in that direction by the enforcement of the law in Pennsylvania and some other states against the use of salicylic acid. Practically all, however, were using artificial color.

In 1910, or four years after the Federal Food and Drugs Act became effective, a still more comprehensive examination was made and published by the Connecticut authorities. By this time the use of salicylic acid had been entirely abandoned by the manufacturers. Of the 73 brands examined only 7 were free from benzoic acid and coloring matter. Of the remaining 66 samples, 48 were found to contain an excessive amount of the preservative, the amount being over double that claimed in 19 of the samples. Only 9 of the 73 brands were found to contain artificial color, showing that the pendulum was swinging away from the use of coloring matter, which, while not prohibited, was required to be declared upon the label. Five of the above samples were found to contain saccharin as the sweetening agent and these brands are reported to have been among the lowest grades examined.

These investigations, covering a period of 14 years, may be taken as typical of existing conditions up to a very recent time and will serve as an interesting basis for comparison with the figures given for the investigation of tomato ketchups in Pennsylvania in the summer of the present year, 1915. The facts stated and the summary given may be verified by reference to the Annual Reports of the Connecticut Agricultural Experiment Station for the years named.

Before taking up in detail the results of the investigations reported in this article, it will be necessary to refer to other factors which have arisen in the meantime through investigations, made principally by the Bureau of Chemistry of the U. S. Dept. of Agriculture, in which it will be found that the microscopic examination of ketchup is necessary in order to determine the past history of the product as regards soundness of the tomato pulp and freedom from decomposition prior to the manufacture of the ketchup.

Not all ketchup manufacturers are able to make their entire year's supply of tomato ketchup during the season when the fruit is ripening and being brought to market and many of them must depend upon the article known as tomato pulp, which is usually concentrated to a certain extent and sterilized or preserved for future use. Investigations at that time of market samples of some of the lower priced and less well known brands of ketchups showed that the conditions must have been very unsanitary or the pulp must have been very carelessly handled to account for the evidences of spoilage in the finished product, indicated by the presence of moulds in abundance and also of yeasts and spores and of dead bacteria.

In 1909, the Bureau of Chemistry published a bulletin entitled, "Bulletin 119, Bureau of Chemistry, U. S. Dept. of Agriculture: Experiments on the Spoilage of Tomato Ketchup, by Dr. A. W. Bitting." In this publication there is detailed the most comprehensive study of ketchup manufacture ever attempted, which was based upon a study of actual manufacturing conditions and included both chemical and bacteriological research.

Dr Bitting's work was supplemented in February, 1911, by another publication of the U. S. Dept. of Agriculture, i. e. "Circular No. 68, Bureau of Chemistry: Tomato Ketchup Under the Microscope, by Dr. B. J. Howard." In this circular was detailed the method of procedure for a microscopic examination which has for its object the determination of the soundness of the product and its freedom from marked evidences of decomposition. A set of tentative standards was also suggested, in which it was stated that not more than 25% of the fields examined under specified conditions, should show the presence of moulds, that the yeasts and spores should be below 25 per 1-60 cubic millimeter and that the number of dead and living bacteria should not exceed 25 million to each cubic centimeter.

Inasmuch as climatic conditions, as well as time of handling, are important factors in raising the number of bacteria, the figures for bacteria must be considered as nearly ideal. In one of the factory experiments detailed in this circular it is stated that the bacterial content of a batch of tomato juice has increased from 7 million per cubic centimeter to 84 million per cubic centimeter within five hours, which is less than a working day.

Another Government publication of interest in connection with tomato ketchup is Circular No. 78, of the Bureau of Chemistry, U. S. Dept. of Agriculture, October 16, 1911, on changes taking place during the spoilage in tomato products by Raymond F. Bacon and P. B. Dunbar. In this circular the problem is attacked from the chemical standpoint and a ratio of citric acid to lactic acid was taken as the basis of determination of the degree of spoilage.

An interesting contribution on a related subject from a non-governmental authority was published in August, 1914, by Dr. W. D. Bigelow and Dr. F. F. Fitzgerald, as Bulletin No. 3, of the Research Laboratory of the National Cannery Association. In this article the subject of tomato pulp, the crude material used by both the soup and ketchup manufacturers, is studied and recommendations embodying many practical points are made.

In the meantime the Bureau of Chemistry Officials of the U. S. Dept. of Agriculture were bringing prosecutions for tomato ketchup sold in interstate commerce in which violation of the law was charged in a number of different ways. Most of the earlier prosecutions, that is prior to 1911, were based upon misbranding charges for excess of preservative, presence of undeclared glucose, etc. About 1910 and from that time up to the present, many cases have been brought under the national law and convictions sustained for a product which is alleged to be "filthy, decomposed and putrid," to quote the words of the section of the act under which these cases were brought. In 1910, such prosecutions as were instituted under this charge, gave no detailed information as to the methods by which such spoilage had been detected, but beginning with 1911, we find that the results of Dr. Bitting's work in 1909 and Dr. Howard's work in February, 1911, are shown in the fact that figures of the moulds, bacteria and yeasts and spores accompany most of the charges of decomposition.

A review of the 30 cases described in the Notices of Judgment from 1 to 3,000, in which figures for these essential factors accompany the charges shows the following results:

In 30 Cases.		Per cent. of fields showing moulds.	No. of Yeasts and spores to each 1/80 Cc.	Millions of bacteria to each Cc.
Maximum,		86	350	490
Minimum,		67	97	21
Average,			118	148

It will be seen that high yeasts and spores and high moulds form the real basis for successful prosecutions. In the instance where but 21 million bacteria were found (this being well within the limits for a clean, high grade product) there were found 62 yeasts and spores to each 1-60 Cc. and moulds in 90 per cent. of the fields examined.

In April and May, 1915, by order of the Pennsylvania Dairy and Food Commissioner, James Foust, there were collected in the State of Pennsylvania 142 samples of tomato ketchup, representing 135 different brands. Of these, 91 samples were collected by Special Agent, H. L. Banzhoff, of Altoona, Pa., in cities and towns outside of Philadelphia, 25 samples were collected in Philadelphia by Special Agent, Robert M. Simmers, of Phoenixville, Pa., and 26 samples were collected in Philadelphia by Special Agent, W. E. Supplee, of Philadelphia.

In view of the inconclusive value of some of the results obtained by the complete analyses of the Connecticut Agricultural Experiment Station, it was decided to estimate the total solids, which would give a basis for comparison of the ketchups from the standpoint of actual values expressed in the form of dry material; the total soluble solids, which would give some idea as to the cellular tissue contributed by the pulp, spices, etc.; the volatile acids expressed as acetic acid, in order to study this factor in connection with the question of the presence or absence of preservatives; the character of the color, whether natural or artificial; a search for saccharin and preservatives and their estimation when found and a tabulation of the results of the microscopic examination conducted according to the directions outlined in Dr. Howard's circular, to which reference was previously made. All of the chemical determinations and tests were made by the standard methods of the American Association of Official Agricultural Chemists, as given in Bulletin No. 107, of the U. S. Dept. of Agriculture.

The following is the list of brands examined, together with the agent's sample number, chemist's analytical number and a statement of the essential facts appearing upon the label. The quantities as stated were all found to be within the limits of tolerance for the amounts stated except in one instance when a half pint bottle bore a label undoubtedly intended for one double the size, which was a manifest error and was ignored.

S. M. R. 11493. C. H. L. 11805. Melrose Catsup. Packed for Githens, Rexsamer & Co., Phila., Pa. Made from tomatoes, spices, vinegar and sugar. Free from artificial coloring. Contents, 11 oz. av. Price, 12 cents.

S. M. R. 11494. C. H. L. 11806. L. & S. Tomato Catsup. Lutz & Schramm Co., Pittsburgh, Pa. The only catsup that has a real tomato flavor. Made from fresh, ripe tomatoes, spices, granulated cane sugar, pure vinegar, onions and salt. Contents, $7\frac{1}{2}$ oz. av. net wt. Price, 12 cents.

S. M. R. 11495. C. H. L. 11807. Mother Cook Brand Tomato Catsup. Colonial Conserve Co., Phila., Pa. Prepared from fresh, ripe tomatoes, sugar, vinegar, onions, salt and spices. Contains 1-10% benzoate of soda. Contents, 10 oz. av. wt. Price, 10 cents.

S. M. R. 11496. C. H. L. 11808. Mother Sharp's Brand Tomato Catsup. S. W. Haney Preserving Co., Phila. Contains 1-10% benzoate of soda. Contents, 5 oz. Price, 7 cents.

S. M. R. 11497. C. H. L. 11809. Ritter's Whole Tomato Catsup with Tabasco. Guaranteed by P. J. Ritter Conserve Co., Phila. Pa. Contains no bezoate of soda or artificial color. Made from whole, ripe tomatoes, spices, vinegar, onions, garlic, salt and sugar. Contents, $8\frac{1}{2}$ oz. av. net wt. Price, 10 cents.

S. M. R. 11498. C. H. L. 11810. Mrs. Williams' Brand Tomato Catsup. Quaker City Pure Fruit & Sugar Preserve Co., Phila., Pa. 1-10 of 1% benzoate of soda. Contents, 9 oz. Price, 10 cents.

S. M. R. 11499. C. H. L. 11811. Snider's Tomato Catsup. Guaranteed by the T. A. Snider Preserve Co., under the Food and Drugs Act. Contains tomatoes, granulated sugar, salt, vinegar, onions, garlic and spices. Contents over 8 oz. av. Price, 15 cents.

S. M. R. 11500. C. H. L. 11812. Apollo Tomato Ketchup. Packed for Halpen, Green & Co., Phila., Pa. This ketchup is made from tomatoes, spices, vinegar and sugar. Free from coloring. Contents, 11 oz. av. Price, 10 cents.

S. M. R. 11501. C. H. L. 11813. Argood Brand Tomato Ketchup. Packed for Fred P. Bell, W. Phila., Pa. Net weight not less than $10\frac{1}{2}$ oz. Price, 15 cents.

S. M. R. 11502. C. H. L. 11814. Monmouth Brand Tomato Ketchup. Put up by Crine Packing & Seed Co., Morganville, N. J. Made from whole, red, ripe tomatoes only. Seasoned with pure spices and contains no artificial color. Net wt., $15\frac{1}{2}$ oz. Price, 12 cents.

S. M. R. 11503. C. H. L. 11815. Schramm's Whole Tomato Catsup. 1-10% benzoate of soda. Net contents, 4 oz. Price, 5 cents. Phila.

S. M. R. 11504. C. H. L. 11816. Harbauer's Tomato Catsup. Made by the Harbauer Co., Toledo, O. Made from tomatoes, granulated sugar, onions, spices and vinegar. Guaranteed free from artificial color. Preserved with 1-10% benzoate of soda. Contents, 6 oz. av. Price, 5 cents.

S. M. R. 11505. C. H. L. 11817. Quaker City Preserve Co.'s Tomato Ketchup. Sodium benzoate. Contents, 6 oz. Price, 5 cents.

S. M. R. 11506. C. H. L. 11818. William Penn Tomato Catsup. Wm. Lauterjung, 234-6 Vine St., Phila., Pa. Contains enough benzoate of soda to prevent mold. Contents, 4 oz. Price, 5 cents.

S. M. R. 11507. C. H. L. 11819. Old Virginia Tomato Catsup. McMechen Preserving Co., Wheeling, W. Va. Made from selected ripe tomatoes, granulated sugar, salt, pure spices, grain vinegar. Preserved with 1-10 of 1% benzoate of soda. Contents, 6 oz. Price, 5 cents.

W. E. S. 977. C. H. L. 11821. Stohrer's Tomato Catsup. Keystone Pickle Works, Phila. Contents, 9 fl. oz. Price, 9 cents.

W. E. S. 978. C. H. L. 11822. Bonny Best Tomato Catsup. Crine Packing and Seed Co., Morganville, N. J. Made from whole, red, ripe tomatoes, distilled vinegar, salt, granulated sugar and purest spices. Contains no artificial color. Contents, 7½ oz. Price, 5 cents.

W. E. S. 979. C. H. L. 11823. Rio Grande Tomato Catsup. Keystone Pickle Works, Phila. Stohrer's. Contents, 9 fl. oz. Price, 10 cents.

W. E. S. 980. C. H. L. 11824. Blue Label Tomato Ketchup. Curtice Bros. Co., Rochester, N. Y. Made by thoroughly domestic methods from red, ripe tomatoes, pure spices, salt, sugar and vinegar. Guaranteed free from artificial color. Contains 1-10% benzoate of soda. Contents, 8 oz. Price, 10 cents.

W. E. S. 981. C. H. L. 11825. Our Pet Tomato Catsup. The Harbauer Co., Toledo, O. Made from tomatoes, granulated sugar, onions, spices and vinegar. Guaranteed free from artificial color. Contents, 6 oz. av. Price, 5 cents.

W. E. S. 982. C. H. L. 11826. Eureka Brand Tomato Ketchup. John Maier, distributor, Phila. 1-10 benzoate of soda. Contents, 5 oz. av. Price, 5 cents.

W. E. S. 983. C. H. L. 11829. Garden Brand Tomato Ketchup. Packed for John Price & Co., Phila. Made from tomatoes, pure spices, vinegar and sugar. Free from artificial color and preservatives. Contents, 11 oz. Price, 10 cents.

W. E. S. 984. C. H. L. 11828. Mountain City Catsup. Lippincott & Co., Phila. and Altoona, Pa. Made from tomatoes, granulated sugar, onions, spices and vinegar. No chemical preservatives used. Contents, 10½ oz. Price, 10 cents.

W. E. S. 985. C. H. L. 11829. Table Talk Tomato Ketchup. Manufactured by R. C. Chance's Sons, Phila. Made from tomatoes, pure spices, vinegar, sugar. Free from coloring and preservatives. Contents, 11 oz. av. Price, 10 cents.

W. E. S. 986. C. H. L. 11830. Crown of Quality Tomato Catsup. Pincus & Crown, Chester, Pa. Made of whole tomatoes, sugar, salt, vinegar, onions and pure spices. 1-10% benzoate of soda. Contents, 4 fl. oz. Price, 5 cents.

W. E. S. 987. C. H. L. 11831. Adelphia Brand Catsup. Adelphia Products Co., distributors, Phila. Made from tomatoes, granulated sugar, onions, spices and vinegar. 1-10% benzoate of soda. Contents, 5 oz. Price, 5 cents.

W. E. S. 988. C. H. L. 11832. Mrs. Dolby's Tomato Catsup. Distributed by The Home Preserving & Pickling Co., 1635 S. Marshall St., Phila. Prepared with 1-10% benzoate of soda to prevent fermentation. Contents, 16 oz. Price, 10 cents.

W. E. S. 989. C. H. L. 11833. Excelsior Tomato Catsup. Wm. Lauteryung, 234-6 Vine St., Phila. Prepared with 1-10% benzoate of soda. Made from fresh, ripe tomatoes. Contents, 10 oz. Price, 10 cents.

W. E. S. 990. C. H. L. 11834. Wilca Brand Catsup. Carl Wilde, Importer, Phila. Made from tomatoes, granulated sugar, onions, spices and vinegar. No chemical preservatives used. Contents, 10½ oz. Price, 10 cents.

W. E. S. 991. C. H. L. 11835. Mendelion Brand Catsup. Distributors, M. Eiseman & Sons, Phila. Absolutely pure and free from artificial color. Contents, 8½ oz. Price, 10 cents.

W. E. S. 993. C. H. L. 11837. Morris Best Tomato Catsup. Lansdale Pure Food Co., Lansdale and Perkasio, Pa., 1227 Germantown Ave., Phila. Contains small tomatoes, trimmings, onions, garlic, spice, sugar. 1-10 benzoate of soda. Contents, 5½ oz. net. Price, 5 cents.

W. E. S. 994. C. H. L. 11838. Sunrise Ketchup. Packed by Phila. Pickling Co. Made from ripe tomatoes, granulated sugar, salt, vinegar, onions, garlic, and pure spices. Contents, 8 oz. Price 10 cents.

W. E. S. 1008. C. H. L. 11872. True Blue Tomato Catsup. Wm. C. Young, Phila. Made from tomatoes, granulated sugar, onions, spices and vinegar. No chemical preservatives used. Contents, 10½ oz., net wt. Price, 10 cents.

W. E. S. 1009. C. H. L. 11873. Campbell's Tabasco Ketchup. Joseph Campbell & Co., Camden, N. J. Pasteurized. Net wt., 17½ oz. Price, 8 cents. (error in labeling, contents was 9 oz.)

W. E. S. 1010. C. H. L. 11874. Rex Tomato Ketchup. The Cudahy Packing Co. Made from fresh, ripe, whole tomatoes (from which the skins, cores and seeds have been removed), granulated sugar, salt, distilled vinegar, spices and onions. Net wt., 8 oz. Price, 12 cents.

W. E. S. 1011. C. H. L. 11875. J. H. Boeckle's Ketchup. Star Pickling Works, Phila. J. H. Boeckle. This condiment is prepared from selected ripe tomatoes, flavored with distilled vinegar, sugar and choice spices. Preserved with 1-10% benzoate of soda. Contents, $4\frac{1}{2}$ fl. oz. Price, 5 cents.

W. E. S. 1012. C. H. L. 11876. Crescent Tomato Ketchup. Guaranteed absolutely pure. Made from and contains only whole, red ripe tomatoes, pure spices, distilled vinegar, granulated sugar, salt, onions and garlic. Net wt., 8 oz. Price, 7 cents.

W. E. S. 1013. C. H. L. 11877. Unity Brand Tomato Ketchup. Frankford Grocery Co., Frankford, Pa. Net weight, $10\frac{1}{2}$ oz. Price, 10 cents.

W. E. S. 1014. C. H. L. 11828. Van Camp's Tomato Catsup. Van Camp Packing Co., Indianapolis, Indiana. Ingredients: Tomatoes, sugar, vinegar, salt, cloves, allspice, cayenne pepper, onions and 1-10 benzoate of soda. Net wt. about 16 oz. Price, 20 cents.

W. E. S. 1015. C. H. L. 11879. Beech Nut Tomato Catsup. Beech Nut Packing Co., Rochester, N. Y. Made from whole, red, ripe tomatoes, vinegar, sugar, spices, salt and onions. Contents, $7\frac{1}{4}$ oz. Price, 15 cents.

W. E. S. 1016. C. H. L. 11880. Brandywine Hills Tomato Catsup. Packed for B. S. Janney, Jr. & Co., Phila. This ketchup is made from tomatoes, pure spices, vinegar and sugar. Free from all artificial coloring and preserved with 1-10% benzoate of soda. No wt. marked. 10 oz. Price, 12 cents.

S. M. R. 11526. C. H. L. 11884. Park Farm Tomato Catsup. Mitchell, Fletcher & Co., Phila. Composed of fresh, ripe tomatoes, granulated sugar, salt, distilled vinegar, garlic, onions and pure spices. Net wt., 8 oz. Price, 15 cents.

S. M. R. 11527. C. H. L. 11885. Heinz' Tomato Ketchup. H. J. Heinz Co., Pittsburgh, Pa. Made from fresh, ripe tomatoes, spices, granulated cane sugar, pure vinegar, onions and salt. Free from benzoate of soda or other drugs, artificial preservatives and coloring matter. Net wt., $8\frac{1}{4}$ oz. Price, 15 cents.

S. M. R. 11528. C. H. L. 11886. Libby's Tomato Catsup. Libby, McNeill & Libby, Chicago, Ill. Natural color and flavor. Free from preservative. Net wt., 10 oz. Price, 15 cents.

S. M. R. 11529. C. H. L. 11887. Sunbeam Tomato Catsup. Austin Nicholls & Co., distributors, N. Y. Prepared from ripe tomatoes, salt, granulated cane sugar, vinegar, onions, garlic and spices. Contents, 16 fl. oz. Price, 25 cents.

S. M. R. 11530. C. H. L. 11888. Our Choice Tomato Catsup. Put up by Wm. King & Co., Phila., from whole, sound, ripe tomatoes, sugar, salt, spices and vinegar. Net wt., $11\frac{1}{4}$ oz. Price, 12 cents.

S. M. R. 11531. C. H. L. 11889. Bonny Best Tomato Catsup. Crine Packing & Seed Co., Morganville, N. J. Made from whole, red, ripe tomatoes, distilled vinegar, salt, granulated sugar, and purest spices. Contains no artificial color. Net wt., $7\frac{1}{2}$ oz. Price, 5 cents.

S. M. R. 11532. C. H. L. 11890. Duchess Brand Tomato Ketchup. Distributed by Alfred Lowry & Bro., Phila. No declaration of preservative or wt. $7\frac{1}{2}$ oz. Price, 10 cents.

S. M. R. 11533. C. H. L. 11891. Rio Grande Brand Tomato Catsup. Stohrer's Keystone Pickle Works. Contains no added preservative. Contents, 9 fl. oz. Price, 10 cents.

S. M. R. 11534. C. H. L. 11892. Monmouth Brand Tomato Ketchup. Put up by Crine Packing & Seed Co., Morganville, N. J. Made from whole, red, ripe tomatoes only. Seasoned with pure spices and contains no artificial color. Contents, $15\frac{1}{2}$ oz. av. Price, 9 cents.

S. M. R. 11542. C. H. L. 11900. Old Homestead Tomato Catsup. Home Pickling Co., 1535 S. Marshall St., Phila. Made from tomatoes, granulated sugar, onions, spices and vinegar. Prepared with benzoate of soda to prevent fermentation. Net wt., 6 oz. Price, 5 cents.

H. L. B. 5953. C. H. L. 11929. A. & P. Tomato Ketchup. Great A. & P. Tea Co., distributors, Jersey City, N. J. Composed of fresh, ripe tomatoes, granulated sugar, spices, onions, garlic, salt and distilled vinegar. Not artificially colored. Contains no preservative. Net wt., 16 oz. Price, 18 cents.

H. L. B. 5954. C. H. L. 11930. White Horse Tomato Catsup. Reid, Murdoch Co., Chicago. Guaranteed free from artificial color. Net wt., 18 oz. Price, 18 cents.

H. L. B. 5955. C. H. L. 11931. Bordeaux Brand Tomato Catsup. The Van Camp Packing Co., Indianapolis, Ind. Made from tomatoes, spices, sugar and vinegar. Net contents, 15 oz. av. Price, 15 cents.

H. L. B. 5956. C. H. L. 11932. Heinz Tomato Ketchup. H. J. Heinz Co., Pittsburgh, Pa. Made from fresh, ripe tomatoes, spices, granulated cane sugar, pure vinegar, onions, salt. Free from benzoate of soda, other drugs or artificial preservatives. Net wt., $8\frac{1}{2}$ oz. av. Price, 15 cents.

H. L. B. 5957. C. H. L. 11933. Beech Nut Brand Tomato Catsup. Beech Nut Packing Co., Rochester, N. Y. Made from whole, red, ripe tomatoes, vinegar, sugar, spices, salt and onions. Contents, $\frac{1}{2}$ pint, Price, 15 cents.

H. L. B. 5958. C. H. L. 11934. Burt Olney's Ketchup. The Burt Olney Canning Co., Oneida, N. Y. Made from fresh, whole, ripe tomatoes, seasoned with pure whole spices, pure grain vinegar, salt, onions and granulated sugar. Free from benzoate of soda and coloring matter. Contents, 8 oz. Price, 10 cents.

H. L. B. 5959. C. H. L. 11935. Crubro Tomato Ketchup. Cruikshank Bros. & Co., Pittsburgh, Pa. Not artificially preserved or colored, only clean and pure materials used. Contents, 7 fl. oz. Price, 5 cents.

H. L. B. 5960. C. H. L. 11936. Mother's Kind Tomato Catsup. Grantham Preserving & Pickling Co., Grantham, Pa. Strictly pure. Net wt., 8 oz. Price, 10 cents.

H. L. B. 5961. C. H. L. 11937. Golden Tree Tomato Ketchup. New England Maple Syrup Co., Boston. Made from whole, red, ripe tomatoes only. Seasoned with pure spices and contains no artificial color. Net wt., $7\frac{1}{2}$ oz. av. Price, 11 cents.

H. L. B. 5962. C. H. L. 11938. Williams' Tomato Catsup. The Williams Bros., Detroit, Mich. Made from tomatoes, sugar, salt, vinegar and spices. Net wt., $11\frac{1}{2}$ oz. Price, 10 cents.

H. L. B. 5963. C. H. L. 11939. Naboth Tomato Catsup. Naboth Vineyards, Brocton, N. Y. Made from ripe tomatoes, spices, vinegar, salt, sugar and onions. Contents, 4 oz. Price, 5 cents.

H. L. B. 5964. C. H. L. 11940. Wagner's Catsup. Prepared by Martin Wagner Co., Baltimore, Md. Made from fresh, ripe tomatoes, spices, granulated sugar, garlic, vinegar, salt and onions. Contents, 8 oz. av. Price, 10 cents.

H. L. B. 5965. C. H. L. 11941. Wingold Catsup. Packed for Dilworth Bros. Co., Pittsburgh. Guaranteed to be made from ripe tomatoes, sugar, spice and vinegar. No chemical preservatives used. Contents, 8 oz. av. Price, 10 cents.

H. L. B. 5966. C. H. L. 11942. Libby's Catchup (pure tomato). Packed and guaranteed by Libby, McNeil & Libby, Chicago. Natural flavor and color. Free from preservative. Contents, $8\frac{1}{4}$ fl. oz. Price, 15 cents.

H. L. B. 4967. C. H. L. 11943. Community Ketchup. No declaration of constituents or preservatives. Net wt., 8 oz. Price, 10 cents.

H. L. B. 5968. C. H. L. 11944. Bull Head Tomato Catsup. Gibbs Preserving Co., Baltimore, Md. No declaration of constituents or preservatives. Net wt., 8 oz. Price, 10 cents.

H. L. B. 5969. C. H. L. 11945. Waldorf Tomato Catsup. The Williams Bros. Co., Detroit, Mich. Made from whole, ripe tomatoes, sugar, salt, distilled vinegar and spices. Net wt., $11\frac{1}{2}$ oz. Price, 10 cents.

H. L. B. 5970. C. H. L. 11946. Rosedale Ketchup. Schwenk & Caldwell, Phila. No declaration of constituents or preservatives. Net wt., not less than $10\frac{1}{2}$ oz. Price, 10 cents.

H. L. B. 5971. C. H. L. 11947. Fort Cumberland Catsup. J. G. Orrick & Son, Cumberland, Md. Prepared from the purest varieties of selected ripe tomatoes. Contents, 10 oz. Price, 10 cents.

H. L. B. 5972. C. H. L. 11948. Prestige Brand Tomato Catsup. For Westmoreland Grocery Co., Greenburg, Pa. Highest quality. Made from tomatoes, granulated sugar, onions, spices and vinegar. Guaranteed free from artificial color. No chemical preservatives used. Net wt., $11\frac{1}{2}$ oz. Price, 10 cents.

H. L. B. 5973. C. H. L. 11949. Parker House Catsup. McMeichen Preserving Co., Wheeling, W. Va. Prepared under strictly sanitary conditions. Contains no chemical preservatives. Net wt., 9 oz. av. Price, 10 cents.

H. L. B. 5974. C. H. L. 11950. Butterfly Tomato Catsup. Packed for Arbuckle and Co., Pittsburgh. Strictly pure. No declaration of constituents or preservatives. Contents, 11½ oz. Price, 10 cents.

H. L. B. 5975. C. H. L. 11951. Hoffman House Tomato Catsup. J. Weller Co., Oak Harbor, Ohio. No declaration of constituents or preservatives. Contents, 11 oz. av. Price, 10 cents.

H. L. B. 5976. C. H. L. 11952. Robin Hood Tomato Catsup. R. C. Williams & Co., distributors, N. Y. Prepared from tomatoes, spices, sugar, onions, salt and vinegar. Natural color. Net wt., 10½ oz. Price, 10 cents.

H. L. B. 5977. C. H. L. 11953. Fayette Brand Tomato Ketchup. Uniontown Grocery Co. Made from tomatoes, spices, vinegar and sugar. Free from coloring. Contents of benzoate of soda stricken off. Contents, 11 oz. av. Price, 10 cents.

H. L. B. 5978. C. H. L. 11954. Knighthood Tomato Catsup. Reese and Co., Phila. Made from tomatoes, granulated sugar, onions, spices and vinegar. Guaranteed free from artificial color, av. net wt., 10 oz. Price, 10 cents.

H. L. B. 5979. C. H. L. 11955. A B C Tomato Catsup. Lee Chat-away Jacob & Co., Carnegie, Pa. No declaration of constituents or preservatives. "Quality first." Av. wt., 10 oz. Price, 10 cents.

H. L. B. 5980. C. H. L. 11956. Monarch Tomato Catsup. Reid, Murdock & Co., Chicago. Made from fresh, ripe tomatoes, uncolored. "We guarantee Monarch Catsup to be made from fresh, ripe tomatoes; it contains no artificial color and is made by a new process, absolutely our own, coming in contact, while cooking, with no other metal than silver, thus retaining to the fullest extent the natural color and flavor of the tomato." Net wt., 16 oz. Price, 25 cents.

H. L. B. 5981. C. H. L. 11957. Astoria Tomato Catsup. S. B. Vanfill Co., Baltimore, Md. No declaration of preservatives or constituents. Net wt., 9½ fl. oz. Price, 10 cents.

H. L. B. 5982. C. H. L. 11958. Our Judge Tomato Catsup. Johnson, Earl, Myers Co., Pittsburgh, Pa. Free from any artificial coloring. Preserved with 1-10 of 1% sodium benzoate. Contents, 10 oz. Price, 10 cents.

H. L. B. 5983. C. H. L. 11959. Winorr Tomato Catsup. The Pressing & Orr Co., Norwalk, Ohio. Made from fresh, ripe tomatoes, vinegar, sugar, salt and pure spices. To prevent fermentation, 1-10 of 1% benzoate of soda is added. Contents, 15½ oz. Price, 10 cents.

H. L. B. 5984. C. H. L. 11960. Iron King Catsup. Vosbank Bros. Co., distributors, Pittsburgh. Preserved with 1-10 of 1% benzoate of soda. Contents, 10 oz. or over. Price, 10 cents.

H. L. B. 5985. C. H. L. 11961. Tube City Tomato Catsup. Packed for Potter McCune Co., McKeesport, Pa. Preserved with 1-10 of 1% benzoate of soda. No declaration of constituents. Contents, 10 oz. Price, 10 cents.

H. L. B. 5986. C. H. L. 11962. Tweed's Tomato Ketchup. Tweed & Botsford, Pittsburgh, Pa. Guaranteed to be made from ripe to-

atoes, sugar, spices, vinegar and onions. No benzoate of soda or other artificial preservative used. Av. net wt., 9 oz. Price, 10 cents.

H. L. B. 5987. C. H. L. 11963. Mars' Tomato Katsup. A. L. Mars & Co., Pittsburgh, Pa. Made from tomatoes, granulated sugar, onions, spices and vinegar. No chemical preservatives used. Guaranteed free from artificial color. Av. net wt., $11\frac{1}{2}$ oz. Price, 10 cents.

H. L. B. 5988. C. H. L. 11964. Luzerne Tomato Ketchup. The Garrahan Canning Co., Luzerne, Pa. Guaranteed and packed by the Garrahan Canning Co. Contains tomatoes, granulated sugar, salt, vinegar, onions, garlic and spices. Net wt., 14 oz. Price, 10 cents.

H. L. B. 5989. C. H. L. 11965. White House Tomato Catsup. Thos. C. Jenkins, Pittsburgh, Pa. Made from tomatoes, granulated sugar, onions, vinegar and spices. Free from artificial color. No chemical preservative used. Av. net wt., $10\frac{1}{2}$ oz. Price, 10 cents.

H. L. B. 5990. C. H. L. 11966. Bonny Best Tomato Catsup. Crine Packing Co., Morganville, N. J. Made from whole, red, ripe tomatoes, distilled vinegar, salt, granulated sugar and purest spices. Contains no artificial color. Prepared with 1-10 of 1% benzoate of soda. Net wt., $15\frac{1}{2}$ oz. Price, 10 cents.

H. L. B. 5991. C. H. L. 11967. Alice Brand Tomato Catsup. Dyer Packing Co., Vincennes, Ind. Made from ripe tomatoes, sugar, vinegar, salt and pure spices. Contains no chemical preservatives. Net wt., 11 oz. Price, 10 cents.

H. L. B. 5992. C. H. L. 11968. Satisfaction Brand Tomato Catsup. Haworth & Dewhurst, Limited, Pittsburgh, Pa. This catsup does not contain a chemical preservative. This catsup is free from artificial coloring. Wt., 11 oz. av. Price, 10 cents.

H. L. B. 5993. C. H. L. 11969. Lehman's High Grade Tomato Ketchup. A. G. Lehman Co., Pittsburgh, Pa. Guaranteed under Pure Food and Drugs Act, Serial No. 23370. Weight, 10 oz. Price, 20 cents.

H. L. B. 5994. C. H. L. 11970. Royal Blue Pure Tomato Catsup. Baer Grocery Co., Wheeling, W. Va., distributors. Made from whole tomatoes, granulated sugar, pure spices and vinegar. No chemical preservative or artificial coloring used. Net wt., $11\frac{1}{2}$ oz. Price, 10 cents.

H. L. B. 5995. C. H. L. 11971. Gold Seal Tomato Ketchup. Alart & McGuire Co., New York. Net wt., not less than $10\frac{1}{2}$ oz. Price, 10 cents.

H. L. B. 5996. C. H. L. 11972. Ladies' Favorite Tomato Catsup. Packed for Heller & Perrin, 67-69, Chatham St., Pittsburgh, Pa. Guaranteed absolutely free from chemicals and artificial coloring. Weight; 10 oz. Price, 10 cents.

H. L. B. 5997. C. H. L. 11973. Nemisella Brand Tomato Catsup (High grade). Canton Canning Co., Canton, Ohio. Prepared from whole tomatoes, pure spices, granulated cane sugar, vinegar, salt, onions and garlic. Preserved with 1-10 of 1% sodium benzoate. Av. net wt., 8 oz. Price, 9 cents.

H. L. B. 5998. C. H. L. 11974. Grant's Brand Tomato Catsup. Prepared and guaranteed by the Indiana Tomato Seed Co., Nabb., Ind. Contains granulated sugar, salt, vinegar, onions, garlic, spices and 1-10 of 1% benzoate of soda. Contents, over 12 fl. oz. Price, 10 cents.

H. L. B. 5999. C. H. L. 11975. Hirsch's Goodies Ketchup for Oyster Cocktail. Hirsch Bros. Co., Louisville, Ky. "The purest in the world." Av. net wt., 7½ oz. Price, 10 cents.

H. L. B. 6000. C. H. L. 11976. Old Virginia Ketchup. McMechen Preserving Co., Wheeling, W. Va. Made from selected ripe tomatoes. Guaranteed under the Pure Food & Drugs Act. Not artificially colored. Net wt., 16 oz. Price, 15 cents.

H. L. B. 6001. C. H. L. 11977. Superb Brand Catsup. Packed for S. B. Charters' Grocery Co., Pittsburgh, Pa. 10 oz. Price, 15 cents.

H. L. B. 6002. C. H. L. 11978. Behr Brand Tomato Catsup. Packed for H. F. Behrhorst & Son, Pittsburgh, Pa. Made from tomatoes, granulated sugar, onions, spices and vinegar. Guaranteed free from artificial color. No chemical preservatives used. Contents, 11 oz. Price, 10 cents.

H. L. B. 6003. C. H. L. 11979. Mrs. Rodes' Home Made Tomato Catsup. A. Rode & Co., Pittsburgh, Pa. Guaranteed pure. Net wt., 10 oz. Price, 10 cents.

H. L. B. 6004. C. H. L. 11980. Burro Brand Tomato Catsup. The Frazier Packing Co., Ellwood, Ind. Guaranteed under the Pure Food & Drugs Act. Net av. wt., 9 oz. Price, 10 cents.

H. L. B. 6005. C. H. L. 11981. Cochrane Tomato Catsup. Cochrane Bros., Pittsburgh, Pa. Made from ripe tomatoes, pure spices, vinegar and granulated sugar. Contains no artificial color or preservative. Contents, 10 oz. av. Price, 10 cents.

H. L. B. 6006. C. H. L. 11982. Marleau's Tomato Catsup. Marleau Packing Co., Toledo, O. Made from tomatoes, granulated sugar, onions, spices, and vinegar. Free from artificial color. No chemical preservative used. Guaranteed under Pure Food & Drugs Act. Av. net wt., 11½ oz. Price, 10 cents.

H. L. B. 6007. C. H. L. 11983. Ko-we-ba Tomato Catsup. Packed for Kolb, Wells, Bauer Co. Co., Indianapolis, Ind. Not artificially colored. Finest quality. Weight, 16 oz. Price, 25 cents.

H. L. B. 6008. C. H. L. 11984. Meco Tomato Catsup. Miller Eberhard Co., Cleveland, O. From choice, whole, ripe tomatoes, sugar, onions, vinegar, salt, cayenne pepper, allspice, cloves, cinnamon and mace. Guaranteed under Pure Food & Drugs Act. Serial No. 36139. 1-10 of 1% benzoate of soda. Contents, 10 oz. Price, 10 cents.

H. L. B. 6009. C. H. L. 11985. Willard Brand Tomato Catsup. J. W. Huston Co., Pittsburgh, Pa. Prepared from ripe tomatoes, distilled vinegar, salt, granulated sugar, selected spices. Guaranteed free of artificial color. Net wt., 10 oz. Price, 10 cents.

H. L. B. 6010. C. H. L. 11986. Rex Brand Tomato Catsup. A. G. Lehman Co., Pittsburgh, Pa. 1-10 of 1% benzoate of soda. Serial No. 23370A. Contents, 10 oz. Price, 10 cents.

H. L. B. 6011. C. H. L. 11987. Ribbon Brand Tomato Catsup. New Castle Grocery Co., New Castle, Pa. Made from red, ripe, tomatoes, whole spices, salt, sugar, and does not contain colors or preservatives. Contents, 8 oz. Price, 10 cents.

H. L. B. 6012. C. H. L. 11988. Menu Tomato Catsup. The Harbauer Co., Toledo, O. Made from tomatoes, granulated sugar, onions, spices and vinegar. No chemical preservatives used. Free from artificial color. Contents, 10 oz. Price, 10 cents.

H. L. B. 6013. C. H. L. 11989. Shawnee Tomato Catsup. The Garrahan Packing Co., Luzerne, Pa. Neither artificial preservative or coloring. Net wt., 10 oz. Price, 8 cents.

H. L. B. 6014. C. H. L. 11990. Magnolia Tomato Catsup. The Wm. Edwards Co., Cleveland, O. 1-10 of 1% benzoate of soda. Guaranteed under the Pure Food & Drugs Act. Contents, 10 oz. Price, 10 cents.

H. L. B. 6015. C. H. L. 11991. Red Rose Tomato Catsup. Packed for C. A. Kurtze, Erie, Pa. Made from tomatoes, vinegar, salt, sugar and spices. Contents, 10 oz. Price, 10 cents.

H. L. B. 6016. C. H. L. 11992. Haller's Blue Star Tomato Catsup. Packed for Jacob Haller, Erie, Pa. Made from sound, ripe tomatoes, vinegar, sugar, pure spices, etc. Contains no preservatives. Net wt., 11½ oz. Price, 10 cents.

H. L. B. 6017. C. H. L. 11993. Elite Pure Food Tomato Catsup. Clark Chapin & Bushnell, distributors, N. Y. Made from fresh, ripe tomatoes, granulated sugar, spices, onions, garlic, salt and distilled vinegar. Contains no preservative. Net wt., 16 oz. Price, 25 cents.

H. L. B. 6018. C. H. L. 11994. Edwards' Tomato Catsup. Wm. Edwards Co., Cleveland, O. Free from added color or artificial preservative. Price, 25 cents. Contents, 16 oz.

H. L. B. 6019. C. H. L. 11995. Grafton Johnson's Tomato Catsup. Whiteland, Ind. Whole ripe Indiana tomatoes, granulated sugar, salt, vinegar, onions and pure spices. Free from preservatives or artificial coloring. Net wt., 10 oz. Price, 10 cents.

H. L. B. 6020. C. H. L. 11996. Commodore Tomato Catsup. Packed for the Weideman Co., Cleveland, O. Natural color. 1-10 of 1% sodium benzoate. Natural color. Net wt., 15 oz. Price, 20 cents.

H. L. B. 6021. C. H. L. 11997. Best Value Tomato Catsup. Put up for the Weidman Co., Cleveland, O. Contents, 11½ oz. av. Price, 10 cents.

H. L. B. 6022. C. H. L. 11998. Dold Quality Tomato Catsup. Jacob Dold Packing Co., Wichita, Kans. This is pasteurized catsup,

made from selected ripe tomatoes, flavored with pure spices, onions, salt, granulated cane sugar and distilled vinegar. No artificial color or preservative. Net wt., 11 oz. av. Price, 10 cents.

H. L. B. 6023. C. H. L. 11999. Weideman Bros. Tomato Catsup. Packed for the Weideman Co., Cleveland, O. Natural color. No chemical preservative. Guaranteed under the Pure Food & Drugs Act. Serial No. 2300. Contents, 11½ oz. Price, 15 cents.

H. L. B. 6024. C. H. L. 12000. Yours Truly Tomato Catsup. Distributed by Yours Truly Co., Chicago, Ill. Absolutely pure. Composed of fresh, ripe, tomatoes, spices, salt, onions, granulated sugar and distilled vinegar. No artificial preservative in this catsup. Av. wt., 16½ oz. Price, 15 cents.

H. L. B. 6025. C. H. L. 12001. Old Inn Tomato Catsup. The Castleman, Blakemore Co., Louisville, Ky. Prepared under strictly sanitary conditions. Net contents, wt., 10 oz. Price, 10 cents.

H. L. B. 6026. C. H. L. 12002. Glendora Tomato Catsup. Packed for Smith & Horton, Ltd., Warren, Pa. From fresh, ripe tomatoes, distilled vinegar, granulated cane sugar, salt, onions, garlic and spices. No artificial coloring. No benzoate of soda. Contents, 10 oz. Price, 10 cents.

H. L. B. 6027. C. H. L. 12003. Veteran Brand Tomato Catsup. Brewster, Gordon & Co., Rochester, N. Y. From tomatoes, granulated sugar, onions, vinegar and spices. Free from artificial color. Contents, 10½ oz. Price, 10 cents.

H. L. B. 6028. C. H. L. 12004. Monogram Brand Tomato Ketchup. Packed for Smith, Perkins & Co., Rochester, N. Y. Made from red, ripe, tomatoes, pure spices and granulated sugar. Net wt., not less than 10 oz. Price, 10 cents.

H. L. B. 6029. C. H. L. 12005. Richelieu Brand Tomato Catsup. Distributed by Sprague, Warner & Co., Chicago, Ill. Tomatoes, granulated sugar, distilled vinegar, onions, spices, salt and garlic. Prepared without preservative. Contents, 1 lb. Price, 25 cents.

H. L. B. 6030. C. H. L. 12006. Sovereign Tomato Catsup. Union Pacific Tea Co., distributors, Washington & Lighthouse Sts., N. Y. From whole, ripe tomatoes, sugar, salt, pure spices and distilled vinegar. No chemicals, preservatives or artificial color. Net wt., 11 oz. Price, 15 cents.

H. L. B. 6031. C. H. L. 12007. Blue Star Tomato Catsup. Packed for Granger & Co., Buffalo, N. Y. Made from tomatoes, vinegar, salt, sugar and spices. Contents, 10 oz. Price, 10 cents.

H. L. B. 6032. C. H. L. 12008. Oakdale Brand Tomato Ketchup. Packed for Samuel Howell, Phila. From tomatoes, pure spices, vinegar and sugar. Free from coloring and preservatives. Wt., 11 oz. Price, 10 cents.

H. L. B. 6033. C. H. L. 12009. Lion Brand Tomato Catsup. Austin Nichols & Co., distributors, N. Y. Tomatoes, spices, sugar,

salt, vinegar and garlic. 1-10 of 1% benzoate of soda. Guaranteed under the Pure Food & Drugs Act. Contents, 16 oz. Price, 18 cents.

H. L. B. 6034. C. H. L. 12010. Blue Grass Belle Catsup. The Castleman, Blakemore Co., Inc., Louisville, Ky. Prepared under sanitary conditions. Contents, 16 oz. Price, 25 cents.

H. L. B. 6035. C. H. L. Nabob Tomato Ketchup. Distributed by Francis H. Leggett & Co., N. Y. Made from tomatoes, pure spices, vinegar and sugar. Free from artificial color or preservative. Guaranteed under the Pure Food & Drugs Act. Contents, 9½ oz. Price, 10 cents.

H. L. B. 6036. C. H. L. 12015. Luxury Brand Tomato Catsup. Packed for Clark Bros., Scranton, Pa. Made from tomatoes, granulated sugar, salt, onions, pure spices, grain vinegar and contains no chemical preservatives. Contents, 8 oz. Price, 10 cents.

H. L. B. 6037. C. H. L. 12016. Holsum Brand Tomato Ketchup. Packed for Sauker & Williams Co., Scranton, Pa. Prepared from ripe tomatoes, distilled vinegar, salt, granulated sugar, selected spices and guaranteed free from artificial coloring matter. Net wt., 10 oz. Price, 10 cents.

H. L. B. 6038. C. H. L. 12017. Booth's Pure Tomato Catsup. The Booth Packing Co., Baltimore, Md. Made from whole, ripe tomatoes, spices, granulated sugar, vinegar, onions, garlic and salt. Finest quality catsup. Net wt., 10 oz. Price, 10 cents.

H. L. B. 6039. C. H. L. 12018. Silver Boy Brand Tomato Catsup. Silver Boy Packing Co., N. Y. Made from sugar, spices, salt, vinegar, and benzoate of soda. Contents, 8 oz. Price, 10 cents.

H. L. B. 6040. C. H. L. 12019. Wilco Brand Tomato Catsup. Packed for Williams Bros. Co., Wilkes Barre, Pa. From whole, red, ripe tomatoes, pure spices, granulated sugar, distilled vinegar and salt. No artificial color. Net wt., 10 oz. Price, 10 cents.

H. L. B. 6041. C. H. L. 12020. Valley Brand Catsup. John L. Getz & Son, York, Pa. Made from tomatoes, spices, salt, vinegar, sugar and 1-10 of 1% sodium benzoate. Net wt., 4 oz. Price, 10 cents.

H. L. B. 6042. C. H. L. 12021. Frendell Brand Tomato Catsup. Distributed by Sprague, Warner & Co., Chicago, Ill. Made from tomatoes, distilled vinegar, granulated sugar, salt, onions, spices and garlic. Prepared without preservative. Contents, 8 oz. Price, 10 cents.

H. L. B. 6043. C. H. L. 12022. Wisco Brand Tomato Catsup. Witman, Schwartz Co., distributors, Harrisburg, Pa., Lewistown, Carlisle. Made from tomatoes, granulated sugar, onions, spices and vinegar. No chemical preservatives used. Contents, 9 oz. Price, 10 cents.

It is of interest to note, in this connection, that the price of ketchup is almost as variable as the names of the brands. There seems to be little or no attempt to standardize price and quantity simultaneously and we therefore see such extremes as 4 ounces for 10 cents and $7\frac{1}{2}$ ounces for 5 cents or nearly four times as much in one case as in the other in proportion to the price paid. If we further take into consideration the amount of solid matter in the ketchup, we find the disparity even greater, for in the above example, the higher priced ketchup, instead of being richer in solids, is actually 20% lower.

The average price per ounce of ketchup is one cent. Now, taking the range of difference in total solids as compared in ketchups of equal price, we find variations all the way from 16.73% for the lowest to 35.32% for the highest or more than double the actual value in one case as compared with the other. Between the lowest residue found, which is 14.42%, and the highest, which is 37.20%, is a ratio of almost 3 to 1, while if we compare the prices and volumes of these two particular samples, we shall find that the lower priced articles contain slightly more actual value than the higher when reduced to the same unit of price comparison.

The following is the tabulated statement of the analytical data:

Chemist's Sample No.	Per cent. total solids.	Per cent. water soluble solids.	Per cent. acidity (calculated as acetic acid).	Color.	Preservative (calculated as sod. benzoate).	Microscopic examination.		
						Per cent. of fields showing moulds.	Yeasts and spores to each 1/60 cu. m. m.	No. of millions bacteria to each Oc.
11805	22.61	21.05	1.68	O. K.	none	0	5	12
11806	22.41	22.02	1.26	O. K.	none	10	5	28
11807	19.45	16.50	1.03	O. K.	1.13	5	0	16
11808	22.12	21.37	1.14	O. K.	0.127	0	1	10
11809	26.99	25.35	1.63	O. K.	none	0	1	12
11810	22.65	21.00	1.80	O. K.	0.127	1	2	23
11811	27.65	26.44	1.62	O. K.	none	1	2	20
11812	22.50	21.33	1.14	O. K.	none	0	2	12
11813	29.26	28.25	1.62	O. K.	none	1	2	44
11814	20.95	20.05	0.84	O. K.	none	0	1	14
11815	19.01	17.05	1.14	O. K.	0.05	0	2	24
11816	27.54	25.10	1.38	O. K.	0.17	0	1	23
11817	18.29	16.29	0.90	O. K.	0.11	15	5	22
11818	24.46	22.90	1.32	O. K.	0.113	0	1	22
11819	18.75	17.45	0.90	O. K.	0.16	5	5	13
11821	24.32	22.94	1.38	O. K.	none	0	1	25
11822	15.58	14.24	0.72	O. K.	none	0	1	25
11823	25.31	24.24	1.40	O. K.	none	0	1	25
11824	20.12	18.43	0.78	O. K.	0.09	0	0	20
11825	24.12	22.94	1.32	O. K.	0.10	0	2	40
11826	19.58	17.01	1.26	O. K.	0.08	0	2	40
11827	24.30	21.96	1.56	O. K.	none	0	2	50
11828	30.36	28.72	1.62	O. K.	none	0	1	50
11829	22.60	21.27	1.26	O. K.	none	0	1	60
11830	23.49	20.00	1.50	O. K.	0.12	10	2	24
11831	26.61	23.33	1.32	O. K.	0.13	0	1	12
11832	24.94	23.40	1.62	O. K.	0.09	0	2	30
11833	26.65	24.20	1.26	O. K.	0.113	0	1	12
11834	30.06	.....	1.62	O. K.	none	0	1	25
11835	29.56	.....	1.80	O. K.	none	0	2	40
11837	21.33	19.41	0.54	O. K.	0.12	20	2	12
11838	16.73	.....	1.26	O. K.	none	0	0	50
11872	29.40	27.00	1.74	O. K.	none	0	2	22
11873	22.98	19.84	1.20	O. K.	none	0	2	22
11874	31.41	28.22	1.50	O. K.	none	1	0	20
11875	22.48	20.00	1.80	O. K.	0.13	0	1	20
11876	24.67	23.67	1.38	O. K.	none	0	0	14
11877	26.23	25.22	1.74	O. K.	none	0	2	20
11878	24.37	23.31	1.14	O. K.	0.20	0	4	24
11879	25.03	23.37	1.74	O. K.	none	1	1	12
11880	21.67	20.13	1.26	O. K.	0.03	0	2	12
11884	24.40	23.46	1.36	O. K.	none	0	2	26
11885	33.62	32.37	1.98	O. K.	none	0	0	2
11886	32.66	30.41	1.56	O. K.	none	0	2	20
11887	24.97	23.50	1.38	O. K.	none	0	1	10
11888	18.56	17.00	1.08	O. K.	none	0	5	67
11889	14.42	13.05	1.14	O. K.	none	1	2	21
11890	29.37	27.34	1.50	O. K.	none	10	2	12
11891	26.13	22.50	1.14	O. K.	none	1	2	21
11892	18.33	17.00	0.84	O. K.	none	0	2	12
11900	24.12	21.75	1.26	O. K.	0.135	0	4	62
11929	23.16	20.00	1.62	O. K.	none	0	2	25
11930	30.37	28.50	1.38	O. K.	none	0	4	21
11931	21.03	19.05	0.78	O. K.	none	0	2	16
11932	33.64	32.20	2.00	O. K.	none	0	0	10
11933	28.10	26.30	1.68	O. K.	none	0	1	12
11934	29.45	27.67	1.38	O. K.	none	0	2	12
11935	29.40	28.51	1.44	O. K.	none	1	2	18
11936	28.56	25.60	1.50	O. K.	none	0	2	25
11937	18.00	16.70	0.78	O. K.	none	0	2	18
11938	15.08	13.54	0.96	O. K.	none	10	4	22
11939	21.11	21.0	1.20	O. K.	none	20	2	20
11940	20.00	18.2	1.02	O. K.	none	1	5	40
11941	19.65	18.54	1.50	O. K.	none	0	2	45
11942	37.20	35.20	1.50	O. K.	none	0	4	20
11943	31.71	29.88	1.57	O. K.	none	0	1	12
11944	24.94	22.81	1.62	O. K.	none	0	1	12
11945	16.30	14.48	0.48	O. K.	none	0	2	21
11946	26.81	25.00	1.74	O. K.	none	0	2	20
11947	17.61	15.46	1.14	O. K.	none	1	5	14
11948	23.06	26.95	1.92	O. K.	none	5	2	27

Chemist's Sample No.	Per cent. total solids.	Per cent. water soluble solids.	Per cent. acidity (calculated as acetic acid).	Color.	Preservative (calculated as sod. benzoate).	Microscopic examination.		
						Per cent. of fields showing moulds.	Yeasts and spores to each 1/60 cu. m. m.	No. of millions bacteria to each Cc.
11949	17.60	15.84	0.90	O. K.	none	1	3	43
11950	22.37	19.10	1.50	O. K.	none	1	3	27
11951	18.85	16.00	1.26	O. K.	none	1	2	18
11952	26.81	25.69	1.32	O. K.	none	1	4	25
11953	26.04	24.16	1.80	O. K.	none	1	5	38
11954	28.94	26.17	1.80	O. K.	none	5	1	25
11955	19.76	17.16	1.62	O. K.	none	5	2	70
11956	28.18	26.45	1.20	O. K.	none	0	3	21
11957	17.11	14.96	0.84	O. K.	none	0	1	24
11958	21.78	19.34	1.56	O. K.	none	0	2	24
11959	35.32	33.03	1.80	O. K.	0.12	0	1	16
11960	18.70	16.40	1.02	O. K.	0.076	1	4	32
11961	19.73	18.80	0.84	O. K.	0.09	5	2	28
11962	22.63	20.70	1.44	O. K.	none	0	2	28
11963	30.09	28.06	1.24	O. K.	none	0	2	28
11964	23.14	21.20	1.28	O. K.	none	0	1	18
11965	29.04	26.46	1.80	O. K.	none	1	1	21
11966	20.53	18.20	0.90	O. K.	0.05	0	1	16
11967	20.40	18.10	0.60	O. K.	none	0	4	24
11968	19.67	17.40	1.06	O. K.	none	10	2	18
11969	22.80	20.26	1.26	O. K.	none	2	1	18
11970	29.83	28.64	2.10	O. K.	none	1	1	32
11971	28.00	25.75	1.56	O. K.	none	0	0	12
11972	30.37	28.96	1.74	O. K.	none	0	2	34
11973	17.63	16.00	1.32	O. K.	0.13	0	1	18
11974	19.41	18.38	0.78	O. K.	0.098	0	2	16
11975	30.27	29.27	2.22	O. K.	none	0	3	21
11976	20.00	19.23	1.06	O. K.	none	0	2	21
11977	26.90	24.00	1.54	O. K.	none	0	1	21
11978	31.23	28.98	1.80	O. K.	none	0	2	32
11979	29.13	26.80	0.50	O. K.	none	5	3	32
11980	22.57	20.71	1.26	O. K.	none	5	1	24
11981	25.77	24.04	1.56	O. K.	none	0	3	34
11982	28.23	26.73	2.34	O. K.	none	0	2	70
11983	27.35	24.15	1.62	O. K.	none	1	1	27
11984	18.40	15.00	1.02	O. K.	0.112	0	3	18
11985	23.98	21.51	1.28	O. K.	none	0	2	14
11986	19.70	17.00	1.38	O. K.	0.094	0	1	14
11987	22.97	20.31	1.02	O. K.	none	0	5	28
11988	29.73	28.07	1.26	O. K.	none	1	2	26
11989	23.83	22.23	1.44	O. K.	none	0	3	18
11990	20.00	18.92	1.26	O. K.	0.065	1	3	18
11991	19.27	14.50	1.38	O. K.	none	0	1	24
11992	18.42	15.80	1.20	O. K.	none	0	2	30
11993	26.09	24.06	1.50	O. K.	none	0	2	25
11994	23.78	21.95	1.68	O. K.	none	0	3	18
11995	24.94	22.18	1.14	O. K.	none	1	2	16
11996	25.67	23.45	1.26	O. K.	0.112	1	1	29
11997	24.07	21.44	1.26	O. K.	none	1	3	26
11998	20.62	19.65	0.90	O. K.	none	0	2	21
11999	22.68	20.87	1.20	O. K.	none	5	4	26
12000	28.60	29.66	1.09	O. K.	none	0	4	18
12001	29.37	28.16	2.16	O. K.	none	0	3	21
12002	28.95	27.60	1.86	O. K.	none	0	2	18
12003	32.60	31.52	2.56	O. K.	none	0	3	42
12004	25.09	23.52	2.28	O. K.	none	0	5	48
12005	20.15	18.38	1.56	O. K.	none	1	1	29
12006	15.08	13.50	1.56	O. K.	none	10	2	21
12007	25.15	22.50	1.20	O. K.	none	0	1	28
12008	24.04	21.76	1.14	O. K.	none	0	4	28
12009	17.91	15.17	0.84	O. K.	0.094	1	1	34
12010	27.07	24.35	1.26	O. K.	none	0	3	24
12011	30.34	18.50	1.06	O. K.	none	5	3	24
12012	19.53	17.66	1.02	O. K.	none	1	2	24
12013	24.71	23.00	1.38	O. K.	none	0	1	14
12014	23.77	21.50	1.14	O. K.	none	0	2	33
12015	24.82	22.66	1.32	O. K.	0.112	0	2	42
12016	25.77	24.04	1.38	O. K.	none	5	4	25
12017	18.70	17.60	0.90	O. K.	0.118	3	10	82
12018	25.56	24.50	1.36	O. K.	none	1	2	28
12019	30.09	28.92	1.50	O. K.	none	1	2	29

The figures for soluble matter have already been discussed in connection with the volume and price factors.

The most remarkable fact which attracts the attention is that in not one of the 142 samples was any artificial color found. This is quite a marked improvement over the results reported in Connecticut, where, as recently as 1910, 12% of the samples were found to be artificially colored.

Another fact, almost equally remarkable, is found that while in 1910 only 10% of the brands examined were found to be free from preservative, in the present examination only a total of 34 out of 142 or 24% were found to contain it, in every case benzoic acid being the substance found. The preservative is always added in the form of sodium benzoate, in which form it is declared upon the label. In the presence of the acetic acid, which is always found in ketchup, the benzoic acid is set free and it is found in the ketchup in the form of the free acid and not as the sodium salt.

It is also a noteworthy fact that only in 2 instances was a sufficient excess of benzoic acid found above the amount corresponding to 1/10 per cent. of sodium benzoate claimed, to warrant the charge of misbranding. It is also interesting to note that in no instance was any preservative found in a product which claimed to be free from it. No saccharin was found in any of the samples.

The underlying causes of this marked improvement with respect to preservatives in ketchup is likely due to the fact that manufacturers have found it cheaper in the end to maintain sanitary conditions and effect, through sterilization of the product, the desired end, than to depend upon the uncertain and questionable efficacy of a preservative. It is likely, too, that the ranks of the manufacturers who do not use preservatives will be still further increased in the near future if the European War continues, for the price of sodium benzoate has increased from less than 50 cents a lb. to over \$5 and the cost of the sodium benzoate in a pint bottle of ketchup at present, is nearly as great as the cost of the tomatoes present. No manufacturer is so altruistic as to continue to use a constituent which adds so much to the manufacturing cost of his product, however much he may believe in its necessity and value, and the sodium benzoate controversy bids fair to be settled in a most interesting and unexpected manner.

The question of the acidity affords an interesting factor for study. It has often been claimed by the users and advocates of sodium benzoate that the manufacturers who did not employ any preservative were compelled to use large (and alleged injurious) amounts of vinegar or acetic acid and spices in order to preserve their product. In so far as the spices are concerned, there appears to be no essential difference between the samples containing preservative and those with-

out. As there is no accurate chemical method of determining small amounts of spices, this is a matter of opinion and not capable of proof. When it comes to the matter of acidity, however, we have an interesting series of figures. The average acidity of the samples containing sodium benzoate is 1.19% calculated as acetic acid. The average acidity of the unpreserved samples is 1.43% or less than 0.25% difference between the two classes. When we take the maximum and the minimum in each class we find that for the samples containing sodium benzoate the minimum acidity is 0.54 and the maximum 1.80, while for the unpreserved samples the minimum is 0.60 and the maximum 2.20. These differences are non-essential and effectually dispose of the contention that a high acidity is necessary in ketchups not preserved with sodium benzoate.

When we consider the figures shown by the microscopic examination, we are impelled to the conclusion that there has been a great improvement in this respect also. The figures for the microscopic factors, condensed and tabulated, are as follows:

	Per cent. of fields showing moulds.	Yeasts and spores to each 1/60 Oc.	Millions of bacteria to each Oc.
Maximum,	20	10	70
Minimum,	0	1	2
Average,	10	5	35

When these figures are compared with those of the samples in which the U. S. Department of Agriculture has alleged decomposition, it will be seen that in no case would the figures warrant the supposition that the sample was in such a state of decomposition as to deserve prosecution. In some of the samples the figures point to a need for improvement in the conditions of handling, but in no instance do the figures indicate criminal negligence in this respect.

In conclusion, we would state that the foregoing investigation shows,

First, That an almost unparalleled improvement has occurred in the quality of the tomato ketchup of the market in the matter of the use of chemical preservatives. The percentage of purity, in the sense of freedom from preservatives in this respect, has risen from less than 6% in 1904 to over 75% in 1915.

Second, That the use of artificial coloration has entirely disappeared at the present time, whereas, in 1904, nearly 90% of the brands examined contained artificial color.

Third, That the allegations of the use of injurious amounts of acids and spices in brands containing no sodium benzoate has no basis in fact.

Fourth, That factory conditions have improved to the extent that not one sample out of 142 brands examined was found to be of an injurious character from the use of unsound materials which were formerly in common use.

Fifth, That only 2 samples out of 142, or less than 2%, were illegal in any respect, and in these instances it was probably a manufacturing error, for there was no reason for the presence of an excessive amount of preservation shown by a study of the microscopic character of the product.

Sixth, That saccharin was not found to be present in any of the samples examined.

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COMMONWEALTH OF PENNSYLVANIA

Pennsylvania

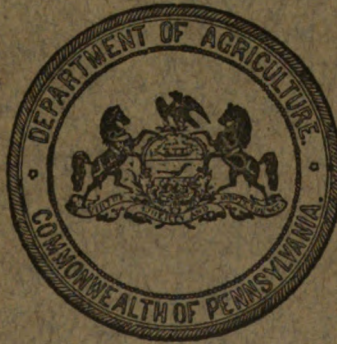
DEPARTMENT OF AGRICULTURE

BUREAU OF STATISTICS

BULLETIN No. 273

Pennsylvania Farms for Sale

A LIST BY COUNTIES



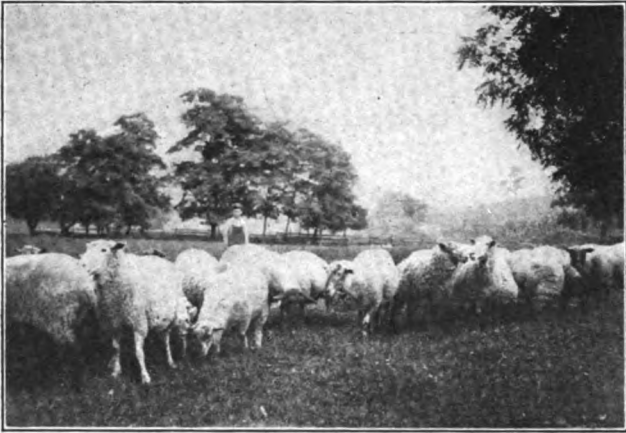
CHARLES E. PATTON, Secretary of Agriculture

L. H. WIBLE, Statistician

Published by Direction of the Secretary

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1916





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LETTER OF TRANSMITTAL.

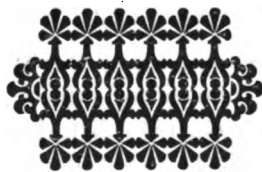
Harrisburg, Pa., February 1, 1916.

Hon. Charles E. Patton, Secretary of Agriculture:

Dear Sir: Requests are coming to the Department almost daily for information relative to farms for sale in Pennsylvania. At your direction this Bureau has collected a list of over three hundred farms for sale, varying in price from two dollars and fifty cents per acre to over one hundred dollars per acre. I submit the description of these farms herewith and recommend that the same be published as a Bulletin of the Department.

Very respectfully,

L. H. WIBLE,
Statistician.



PREFACE.

The information contained in the following pages descriptive of over three hundred farms for sale in Pennsylvania was collected by the Bureau of Statistics of this Department, for the purpose of disseminating the same to persons interested in agricultural pursuits. It should be clearly understood however, that none of these farms is the property of the State; neither does the State sell them or act as an agent in their sale.

Many of the farms listed are among the lower priced farms of the State, but doubtless offer excellent advantages and opportunities to the home-seeker possessing some knowledge of agriculture.

The variety and volume of the crops produced in Pennsylvania are large, and by reason of the farms being within short, easy and cheap shipping distance over good roads and rapid transportation to the markets of this and adjoining states, the value of these crops is correspondingly increased.

It is attempted to give such information concerning the land for sale as will present it in its true light, and give to the person seeking to purchase a farm, reliable data from which to form a conclusion as to whether the farm described is of the character of the farm sought by the would-be purchaser.

It is our desire to have every acre of Pennsylvania farm land occupied by the best possible farmer, and the department stands ready to give any assistance in its power and all possible information to anyone interested and anxious to accomplish this desirable result.

CHARLES E. PATTON,
Secretary of Agriculture.

Harrisburg, Pa., February 4, 1916.



PENNSYLVANIA FARMS FOR SALE.

Allegheny County.

No. 1.—Farm of 92 acres, situated in Elizabeth Township; one and one-half miles from railroad station and postoffice at Elizabeth, R. D. No. 1; on line of P. & L. E. Railroad; one-fourth mile from school; one and one-half miles from church, seven different denominations. Highways are level macadam roads. McKeesport is seven miles distant and may be reached by rail and highway. Surface is part hilly and part level. Limestone soil. This farm is all in grass. Sixty-five acres are tillable. Thirty apple trees and some peach, pear, plum and cherry. Soil is best adapted to corn, oats, wheat, clover and garden truck. Fences are in fair condition. No house. Barn 30x50 feet and other buildings. Water is piped to the house site and barn. Price, \$4,000.00. Terms, \$1,000.00 cash, balance in payments. Farm is assessed at \$4,600.00. There is a 4 ft. vein of coal under sixty acres. Must be sold to close an estate. Address Miss E. McDonald, Executrix, Box 12, Elizabeth, Pa.

No. 2.—Farm of 75 acres, situated in Jefferson Township; one mile from postoffice and railroad at Wilson, on line of P. V. & C. Railroad. One mile from school and the same distance to Presbyterian and Methodist churches; one mile from milk station. Highways are good. McKeesport with a population of 50,000 is four miles distant. Surface is rolling and altitude about 1,100 feet. Limestone soil. Fifteen acres in meadow and fifteen acres in timber. Sixty acres tillable. Best adapted to wheat, corn, oats and potatoes. Fences are generally woven wire and barbed wire. Six-room house with hall, good condition. Bank barn, 38x20 feet, good condition. House and barn are watered by well; fields, by running water. Price, \$100.00 per acre. Terms, one-third cash and balance on mortgage. This is one of the best producing farms in the township. It is well adapted to trucking and is convenient to good markets. Address A. G. Wilson, Wilson, Pa.

Armstrong County.

No. 3.—Farm of 178 acres, situated in Burrell Township; one mile from Cochran Mills postoffice, seven miles from railway station at Vandergrift, on West Penn Railroad. Three-fourths mile from school; two miles from Methodist and Lutheran churches; two miles from creamery. Highways are hilly. Vandergrift has a population

of four thousand and is seven miles distant. Surface is rolling and level. Soil is sandy loam. 130 acres under cultivation, balance in timber. The fruit consists of apples, pears and cherries. Well adapted to all farm crops grown in this latitude. Woven and barbed wire fences, good condition. House, 18x42 feet, six rooms, good condition. Bank barn, 40x60 feet. Wagon shed, corn crib and hog pen combined, good condition. House and barn are watered by spring. Price, \$6,000.00. Terms, one-third cash, balance on time. This farm is in gas territory. Underlaid with three veins of Freeport coal. Address William Haney, 9 Lyme street, Sharon, Pa.

No. 4.—Farm of 100 acres, situated in West Franklin Township; two miles from postoffice and railroad station at Cowansville, B. R. & P. Railroad. Kittanning is the nearest large town; population, 10,000; distance seven miles and may be reached by rail and highway. Surface is high on Chestnut Ridge. Altitude, 1,400 feet, Loam soil. Fifteen acres in meadow; 25 acres in timber, second growth chestnut. Seventy-five acres tillable. 40 apple trees, 20 cherry, pears, peaches and plums. Farm is well adapted to all kinds of grain, hay and fruit. Rail and wire fences, in good condition. House, 32x36 feet, in good condition. Bank barn, forty-five feet square, in good condition. Wagon shed and small buildings. Barn and house are watered by wells; fields, by springs. Price, \$50,00 per acre. Terms, one-half cash and balance on time at 4 per cent. This farm is underlaid with four veins of coal and 14 foot vein of limestone. Gas Territory. Address Daniel Berger, 33 Park street, North East, Pa.

No. 5.—Farm of 111 acres, situated in Kiskiminetas Township; five miles from Appollo postoffice and railway station on line of P. R. R.; one mile from school; two and one-half miles from church. Highways are good clay roads but somewhat hilly. Surface is rolling. Seven acres in meadow, and twelve in timber, hardwood. Ninety-five acres tillable. 50 apple, 8 plum and ten peach trees. Adapted to all cereal crops grown in this latitude. Wire fences. Eight-roomed house, in poor condition. Good barn, 50 feet square. Spring at door; watering trough at barn. Water in every field except two. Price, \$4,500.00. Terms, \$2,000.00 cash and balance to suit purchaser. Two gas wells pay \$50.00 each per year. Whole farm is underlaid with limestone. Owned by Philip Deemer's Heirs. Address D. E. Stitt, Apollo, Pa.

No. 6.—Farm of 32 acres, situated in Washington Township; one mile from Wattersonville postoffice; one and one-fourth miles from Redbank railway station, on P. R. R. One and one-fourth miles from school and church, Methodist; one and one-fourth miles from milk station. Highways are fair. East Brady with a population of 2,000

is five miles distant, and may be reached by rail and highway. Surface is rolling, and altitude about 600 feet. Twenty acres tillable. Apple, peach, pear and plum orchard. Well adapted to corn, rye, buckwheat, potatoes, etc. Board, picket and rail fences, fair condition. House has six large rooms and is in good condition. Water is piped from spring to house. Fields are watered by brook. Price, \$1,900.00. Terms, cash or payments. Good home markets for all products, especially for meat and poultry. Land is leased for gas. Address N. O. Claypool, Wattersonville, Pa.

No. 7.—Farm of 60 acres, situated in Sugarcreek Township; two and one-half miles from railway station at Chicora, on line of B & O. Railroad; one-fourth mile from school; two and one-half miles from Methodist, Lutheran, Presbyterian and Catholic churches. Creamery and cheese factory at Chicora. Good roads. Chicora has a population of 1,300. Land is rolling. Soil is rich and loamy. 45 acres tillable; 16 acres in timber, oak and chestnut. Orchard consists of 25 apple and some peach, cherry and pear trees. Well adapted to wheat, corn, oats and buckwheat. Fences are rail, wire and picket. No buildings on this farm. Price, \$20.00 per acre. Terms, to suit purchaser. Owner, Rose A. Black, Glens Falls, N. Y. Address F. P. McBride, Attorney in Fact, Fenelton, Pa.

No. 8.—Farm of 120 acres, situated in Madison Township; six miles from New Bethlehem postoffice, R. D. No. 5; one and one-half miles from railway station at Reedy, on line Shawmut Railroad; one-half mile from school; near Baptist, Methodist and Presbyterian churches. Fairly good roads. Surface is part level and balance is rolling and hilly. Good clay soil. About twenty acres in meadow. Eighty acres tillable. There is a good apple orchard. Some peach and cherry trees. Adapted to hay, oats and corn. Rail fences. Two story frame house, 16x28 feet, with cellar. Another house of the same size. No barn. Spring at each house. Price, \$3,200.00. Terms, one-half cash and balance on mortgage. There is a vein of good coal opened up on farm. Limestone, iron ore and fire clay. Farm slopes to the morning sun. Address Mrs. J. H. Young, R. D. No. 3, Apollo, Pa.

No. 9.—Farm of 218 acres, situated in Cowanshannock Township; four miles from Dayton postoffice, R. D. No. 11; three miles from railway station at Echo, on line of B. R. & P. Railroad; one mile from school; three miles from Methodist and Presbyterian churches; three miles from milk station. Good roads. Rural Valley is the nearest large town. It is three miles away and has a population of 3,500. The general surface is rolling and hilly. High altitude. Clay and chestnut soil. Forty acres in meadows; twenty-two acres in timber, good oak. 190 acres tillable. Fruit consists of 60 bearing

apple and 25 bearing peach trees. Adapted to general crops, especially hay. Rail and wire fences, need repairs. Six-room house and in good condition. Barn, 60x60 feet, good condition, Wagon shed and corn crib. House is watered by spring and well; barn, by well; fields, by good spring and three runs. Price, \$6,000.00. Terms, agreeable. Address Mrs. Maggie S. Kroh, Rural Valley, Pa.

No. 10.—Farm of 230 acres, situated in Cowanshannock Township; at Rural Valley postoffice; one-half mile from railway station at Yatesboro, on line of B. R. & P. Railroad; near school and Methodist, Presbyterian, Lutheran and Catholic churches; at milk station. Good state highway. General surface is rolling and hilly. Medium altitude. Clay and gravel soil. 50 acres in meadow; 60 acres in timber, good oak and chestnut. 150 acres tillable. 50 apple, 15 peach, 30 pear, 20 plum and 10 cherry trees. Adapted to general farming, dairying and trucking. Ten-room house, excellent condition; another house with eight rooms, fair condition. New barn, 54x60 feet. Barn, 25x40 feet, fair condition. Water is piped to house and barn from spring. Fields are watered by spring and creek. Price, \$12,000.00. Terms, agreeable. Two gas wells on farm and gas reserved for domestic purposes. A part of this farm can be sold off in lots at from \$200.00 to \$400.00 each. Address Mrs. Maggie S. Kroh, Rural Valley, Pa.

Beaver County.

No. 11.—Farm of 208 acres, situated in Hanover Township; eight miles from Hookstown postoffice, R. D. No. 2; eight miles from Burgettstown, on line of Pennsylvania Railroad; one-half mile from school; one-half mile from church, Presbyterian and United Presbyterian. State highway is hilly but very good. Surface is rolling and every acre, not in timber, is tillable. Altitude, 1,400 feet. Soil is part limestone and part sandy. Eighty acres in meadow and twenty-five in timber. 180 acres are tillable. Large apple orchard. Adapted to corn, wheat, rye, oats and potatoes. Rail and wire fences, all in fair condition. Brick house, nine rooms, fair condition. Frame barn, 40x62 feet. Stable, 25x40 feet. Large two-story wagon shed, new corn crib. House is watered by spring and cistern; barn, by trough; spring in every field. Price, \$65.00 per acre. Terms, half cash. Owner cannot farm and wishes to sell. Address Mary E. Ramsey, 430 Mill street, Coraopolis, Pa.

No. 12.—Farm of 48 acres, located in Ohio Township; three miles from railway station at Smiths Ferry, on line of railway; one mile from school and one mile from Methodist church. Level highways. Whole farm can be cultivated. Adapted to general farming. Fences are fair. Old house, seven rooms. Large barn and in fair condition. House is watered by well and barn by springs. Price, \$2,500.00.

Terms, cash. Address Mrs. Emma Rauch, St. Clair avenue, East Liverpool, Ohio.

No. 13.—Farm of 115 acres, situated in South Beaver Township; nine miles from Beaver Falls, R. D. No. 2; four miles from Darlington, on line of Lisburn Railroad; one-half mile from school and church; three miles from condensing plant. Good roads. Surface is rolling. Sandy loam and clay soil. 45 acres in meadow; 25 acres in timber, white oak. Seventy-five acres tillable. Fruit: 50 peach, 30 apple and 35 plum trees. Adapted to corn, oats, wheat and potatoes. Good wire and rail fences. Good six-room house, 18x40 feet. Barn, 24x56 feet. Granary, corn crib, etc. House is watered by well; trough at barn; fields are watered by springs. Price, \$45.00 per acre. Terms, cash or time. Four veins of coal. Free gas piped all through the house. Good meadows. Telephone in house. Address James Tennis, R. D. No. 2, Beaver Falls, Pa.

Bedford County.

No. 14.—Farm of 137 acres, situated in West Providence Township; five miles from Everett postoffice, R. D. No. 4; and railway station, on line of H. & B. T. R. R.; one and three-fourths miles from school; and the same distance from Christian and Lutheran churches. Dirt roads, in good condition. Everett is the nearest town, five miles distant with a population of 2,000. About one-half the farm is bottom land and the balance is part level and part hilly. Bottom land is loam and balance is red shale. 20 acres in meadow and 25 acres in timber. Saw timber was cut sometime ago but there is still enough left for farm repairs. 110 acres tillable, but only 80 acres under cultivation now. Some apple trees, peaches and grape vines. Adapted to corn, oats, wheat, hay and potatoes. Wire and rail fences, in fair condition. Brick house, 20x32 feet with L, 16x16 feet; frame kitchen. Bank barn, 38x64 feet, wagon shed, 28x30 feet, corn crib and other necessary buildings. House and barn are watered by springs; fields, by springs and creek. Price, \$3,200.00. Terms, one-half cash and balance to suit purchaser. The house alone would cost \$2,000.00. Good neighborhood. Good fishing. Address Ira D. Mellott, R. D. No. 4, Everett, Pa.

No. 15.—Farm of 142 acres, situated in Snake Spring Township; seven miles from Everett postoffice, R. D. No. 1; six miles from Mt. Dallas, on line of Huntingdon and Broad Top Railroad; one-half mile from school; and one and one-half miles from Brethren and Dunkard churches. Good township roads; three-fourths of a mile to State Highway. Farm land is rolling and timber land is mountainous. Sandy loam and clay soil. 15 acres in meadow, and 82 acres in timber, young oak and chestnut. 60 acres tillable. 50 apple,

40 plum, 25 pear, cherries, currants and raspberries, etc. Farm is well adapted to wheat, corn, oats, potatoes, hay and fruit. 568 rods of new woven-wire fence. House has seven rooms and kitchen, old but in fair condition. Bank barn, 35x50 feet, good condition; machine shed, 26x30 feet, corn crib, hog pen, etc. House and barn are watered by springs; fields, by springs and mountain streams. Price, \$2,500.00. Terms, one-third cash and balance to suit purchaser. This farm is nine miles from Bedford, the county seat. Address J. C. Starr, R. D. No. 1, Everett, Pa.

No. 16.—Tract of 344 acres of woodland, situated in Hopewell Township; one-fourth mile from Hopewell postoffice, R. D. No. 2; railway station at Cypher, on line of Huntingdon and Broadtop Railroad; one-fourth mile from church and school. Good dirt roads. Everett is four miles away and has a population of 1,500. Surface is mostly smooth. Principally slate soil. Whole tract is in timber, young oak, pine, etc. 250 acres tillable if cleared. No buildings. Enough timber to pay for it. Railroad runs through the tract. Price, \$2,000.00. Terms, cash. Address Silas Ritchey, Yellow Creek, Pa.

Berks County.

No. 17.—Farm of 79 acres, situated in Spring Township; four miles from Sinking Spring postoffice, R. D. No. 2; two and one-half miles from railway station at Fritztown, on line of Columbia & Reading Railway; one-half square from school; one mile from Reformed and Lutheran churches and one-half mile from United Brethren church. Good roads. Three miles to Mohnton population 1,600. Seven and one-half miles to Reading, population 110,000. Trolley runs through farm. Surface is rolling. Altitude, about 400 feet. Iron stone soil. Seven acres in meadow. Practically all tillable. 25 apple, 20 plum, 8 pear, 12 sour cherry and 6 sweet cherry trees. Adapted to all farm crops and tobacco. Rail and wire fences, all good. Stone, six-roomed house, extra good. Barn, 45x90 feet, fine condition. House is watered by pump; barn, by running water; fields, by running water. Price, \$8,000.00. Terms, \$5,000.00 cash and balance on mortgage at 5 per cent. This farm is underlaid with minerals. Address George E. Shupp, Shillington, Pa.

No. 18.—Farm of 83 acres, situated in Robeson Township; two miles from Elverson postoffice, R. D. No. 1; one mile from railway station at Cold Run, on line of W. & C. Railroad; one-fourth mile from school; one and one-half miles to Lutheran and Methodist churches; two and one-half miles to milk station. Highways are hilly. Birdsboro, six miles distant, has a population of 2,200. May be reached by rail and highway. Surface is level. Sandstone soil. Three acres in timber, chestnut and white oak. 80 acres tillable.

50 apple, 6 pear, 15 plum and 6 cherry trees. Best adapted to corn, wheat, etc. Post and wire fence, good. Two and one-half story stone house with kitchen attached. Large stone barn in good condition; other outbuildings, all in good condition. House is watered by spring and barn by well. Price, \$4,200.00. Terms, cash and mortgage. Will make terms of sale very easy to accomodate purchaser. Address Rev. G. Paronessa, R. D. No. 1, Temple, Pa.

No. 19.—Farm of 43 acres, located in Alsace Township; one and one-fourth miles from Stony Creek Mills postoffice, R. D. No. 1; and the same distance from trolley line; one mile from school; two miles from Lutheran and Reformed churches; one and one-half miles from milk station. The highways are somewhat hilly. Reading is four miles distant and has a population of 110,000. Surface is somewhat hilly but can all be worked by machinery. Sandy loam soil. Twenty-two acres tillable; nineteen acres in timber, oak and chestnut. 50 apple, 18 cherry, 8 pear trees, some peaches and quinces. Adapted to general farming and trucking. Mostly stone fences and in good condition; rail fences are in fair condition. Stone house, 24x36 feet, seven rooms with cellar and attic. Barn, 34x58 feet. House and barn need some repairs. Wagon shed, pig sty and work shop—all in good condition. Well at house and spring at barn. Price, \$3,000.00. There are three springs of never-failing water elevated sufficiently to supply water to house for bath. Plenty of sand and building stone. Address Conrad W. Hinnershitz, Stony Creek Mills, Pa.

No. 20.—Farm of 208 acres, situated in Centre Township; two miles from Centreport, R. D. No. 1; three miles from railway station at Mohrsville, on line of P. & R. Railroad; one-half mile from school; one and one-half miles from Reformed and Lutheran churches; one mile from creamery and condensing plant. Good roads. Reading is twelve miles distant and may be reached by rail and highway. Surface, rolling. Altitude, 1,100 feet. Good red gravel soil. Twenty acres in meadow; ten acres in timber, oak and chestnut. 178 acres tillable. Apple, pear and peach orchard. Best adapted to wheat, rye, corn, oats and potatoes. Wire fences, fair condition. 14-roomed house. Barn, 38x108 feet. Two corn cribs and wagon sheds. House is watered by pump; barn, by running water; fields, by stream. Price, \$8,000.00. Terms, \$4,500.00 cash, and balance on mortgage. This is a good stock farm because of the good water supply and splendid pasture. Address F. W. Sunanday, Bernharts, Pa.

No. 21.—Farm of 50 acres, located in Alsace Township; four miles from Oley, R. D. No. 1; seven miles from Reading; one-fourth mile from school and church, Lutheran and Reformed; two miles from trolley at Stony Creek; two miles from milk station. Thirty-five acres tillable; eight acres lowland pasture; four acres chestnut,

oak and hickory timber. 100 apple, 100 cherry, 50 peach, 50 plum and 30 pear trees. Some chestnut and shell bark trees. Some stone fence and some wire. Log house, 25x40 feet, good condition. Good barn, 30x52 feet. New summer kitchen, spring house, chicken house and other necessary outbuildings. House is watered by spring; barn, by pumps; and fields by springs. Price, \$3,600.00. Terms, cash. One acre in truck, including rhubarb, currants, asparagus, etc. Address Daniel Angstadt, R. D. No. 1, Oley, Pa.

No. 22.—Farm of 140 acres, located in Bethel Township; one mile from Bethel postoffice, R. D. No. 1; eight miles from railway station at Myerstown, on line of Philadelphia & Reading Railway; one mile from school, church, creamery and milk station. Highways are level and good. Bethel has a population of 500. Surface is level. Soil is sandy loam. Eighty acres tillable. 2,700 peach, 200 apple, 150 pear, 12 quince and 12 cherry trees. Adapted to all farm crops. Fences are fair. Frame house, 30x30 feet, good condition. Good barn, 35x120 feet. Shed, 30x35 feet and new pig sty. House and barn are watered by springs; fields, by mountain brook. Price, \$5,000.00. Terms, one-half cash and balance on mortgage at 5 per cent. Address J. George Rick, Bethel, Pa.

No. 23.—Farm of 78 acres, situated in Exeter Township; three miles from Oley postoffice, R. D. No. 1; six miles from railway station at Reading, on line of Philadelphia and Reading and Pennsylvania Railroads; one-eighth mile from school; one and one-fourth miles from Lutheran and Reformed churches; two miles from creamery and one mile from milk station. Roads are hilly but good and solid. Reading may be reached by highway and trolley. Surface is somewhat hilly sloping to the southeast. Altitude about 600 feet. Soil is good and is part sandy loam and part gravel. Thirteen acres in meadow; 12 acres in timber, chestnut and oak. Fifty acres tillable. 150 apple, 50 pear, 25 peach and 20 cherry trees. Adapted to general farming, fruit and truck. Good woven wire fences. House is two-story brick, 28x41 feet, mansard roof; and is suitable for two families. Good barn, 30x48 feet, and L, 20x30 feet. Wagon shed, corn crib and poultry house. House and barn are watered by well; fields, by spring water. Price, \$6,500.00. Terms, reasonable. \$4,000.00 may remain on mortgage. Address George S. Diener, Oley, aP.

No. 24.—Farm of 147 acres, situated in District Township; in the town of Landis Store; four and one-half miles from Barto, on line of P. & R. Railway; one-fourth mile from school; three miles from Lutheran and Reformed churches and five miles from Catholic Church; near creamery and cheese factory. Crushed stone roads, a little hilly. Reading, twenty miles away, may be reached by trolley. Surface is nearly level. Fifteen acres in meadow and thirty acres

in second growth timber. One hundred acres tillable. Fifty apple and different kinds of other fruit. Wire, rail and some stone fence. Large stone house, built for three families. Barn is one hundred feet long and is up to date in condition. Large straw house, large new chicken house, wood house and cement pig house. Fine supply of water for house and barn from running spring. Price, \$7,500.00. Terms, reasonable. \$4,000.00 may remain on mortgage at 5½ per cent. interest. Good neighborhood. This farm is in high state of cultivation. About 35 acres are out in wheat and rye and was well fertilized. Address H. W. Kemp, Bally, Pa.

No. 25.—Farm of 75 acres, located in Longswamp Township; three miles from Mertztown postoffice, R. D. No. 1; three miles from railway station at Topton, on line of East Penn Railroad; one-half mile from school; three miles from Reformed and Lutheran churches; one-half mile from creamery. Roads are hilly but good and solid. Topton has a population of 2,000. Surface is rolling. Iron stone soil. Eight acres in meadow; nine acres in timber, chestnut and oak. Fifty acres tillable. Sixty apple and twenty cherry trees. Adapted to wheat, corn, oats and grass. Rail and wire fences, good condition. Stone house, two and one-half story, 20x26 feet, good condition. Barn, 35x55 feet. Wagon shed, blacksmith shop, corn crib and pig sty—all in good condition. House and barn are watered by well; fields, by running water. Price, \$3,600.00. Terms, cash. This is an ideal dairy and poultry farm. The adjoining farm may be purchased if additional land is desired. Address Alfred A. Reinert, 1032 Robeson St., Reading, Pa.

Bradford County.

No. 26.—Farm of 113 acres, situated in Springfield Township, five miles from East Smithfield postoffice; seven miles from railway station at Columbia Cross Roads, on line of P. A. R. R.; one mile from school and one mile from Methodist church. Roads are good but somewhat hilly. Surface is hilly. Altitude is about 2,000 feet. Chemung rock soil, good. Ten acres in meadow; seventy acres in timber, virgin growth consisting of hemlock, pine, maple, beech, oak, chestnut, ash and hickory. About forty acres are tillable. Apple orchard; some cherries and grapes. Adapted to corn, oats, buckwheat and potatoes. Woven wire fences, good condition. Good twelve-room house. Three barns, tool shed, poultry house. Telephone in house and rural delivery passes the door. House is watered by well; barn, by spring; fields, by running stream. Price, \$6,500.00. Terms, \$2,000.00 cash and balance before the removal of timber. Good farming community.

About 400,000 feet fine timber. Address Mrs. Edna W. Dwyer, Troy, Pa.

No. 27.—Farm of 175 acres, located in Armenia Township; four miles from Troy postoffice, R. D. No. 1; railway station at Troy, on line of Pennsylvania Railroad; one-fourth mile from school and three-fourths mile from church; four miles from creamery and cheese factory. Troy has a population of 2,500. Surface is level. Red shale soil. Thirty acres of meadow; fifty acres in timber, hardwood and hemlock. Ninety acres tillable. Apple, plum, pear and cherry orchard. Well adapted to general farming and potatoes particularly. Woven wire fences. Good eight-room house. Barn, 30x42 feet. Shed, hen house and hog pen. House and barn are watered by well; fields, by springs. Price, \$5,000.00. Terms, part cash and balance on long time payments. Livestock, farm implements and crops are included in this sale. Fifty thousand feet of timber and two thousand cords of wood. This is a bargain. Address C. E. Butler, R. D. No. 1, Troy, Pa.

No. 28. Farm of 75 acres, situated in Sheshequin Township; four miles from Towanda postoffice, R. D. No. 7; three miles from railway station at Towanda, on line of Lehigh Valley Railroad; two miles from school; one and one-half miles from Methodist church; three miles from creamery. Highways are hilly but are fairly good roads. Towanda is the nearest large town and has a population of over 5,000. Surface is hilly. About sixty-five acres tillable. Fruit consists mostly of apples but there are some peach, cherry and pear trees. Wire, stone and board fences, fair condition. Seven-room house. Large barn, chicken house, corn crib, tool house and wood shed. Pump at house. Fields are watered by spring. Price, \$4,500.00. Terms, part cash. Large stone quarry. Water power on farm. Address Miss Annie H. Franklin, 166 West Horter St., Germantown, Pa.

No. 29.—Farm of 215 acres, located in Columbia Township; two miles from Snedekerville postoffice and railway station, on line of Pennsylvania Railroad; one-fourth mile from school; three miles from church; three miles from creamery and cheese factory. Troy is the nearest large town and has a population of 1,500. Surface is rolling. Red shale and clay soil. Thirty acres in meadow; forty acres in timber, mostly hard wood. About 170 acres tillable. About 25 apple trees and some cherries, pears and plums. Adapted to corn, oats, buckwheat and grass. Rail and wire fences. House, 24x30 feet; with wing, 18x24 feet. Barn, 34x60 feet with basement. Stanchions for 35 cows. House is watered by wind mill; water piped to barn; fields, by springs. Price, \$8,000.00. Terms, \$2,000.00 down, and balance in payments at four per cent. This farm has two silos

and will easily keep forty cows. Sold \$2,400.00 worth of milk in 1914. Milk taken from door. Telephone and daily mail. Address H. E. Chace, Troy, Pa.

No. 30.—Farm of 92 acres, located in Wells Township; three miles from Gillett postoffice, R. D. No. 3; Gillett is on line of Northern Central Railroad; one-half mile from school; three miles from Baptist church; two miles and one-half from cheese factory; three miles from milk station. Good dirt roads. Elmira, N. Y., is eleven miles away and has a population of 42,000. May be reached by rail and highway. Surface is mostly level. Soil is in a high state of cultivation. Seventy-three acres in meadow; fifteen acres in timber, hemlock, pine, oak and chestnut. Seventy-three acres tillable. Apple, cherry and prune trees, grape vines, etc. Adapted to corn, oats, buckwheat and potatoes. Rail and wire fences. No house. Barn, 40x42 feet, in good condition. Barn is watered by well; fields, by springs. Price, \$1,500.00. Address Raymond Baker, Gillett, Pa.

No. 31.—Farm of 280 acres, located in Warren Township; two miles from Little Meadows postoffice; three miles from high school; two miles from Catholic, Methodist and Presbyterian churches; two miles from creamery. Good dirt roads. Owego, New York, is eleven miles away and has a population of 10,000. May be reached by rail and highway. This is a fine hill farm. Altitude, 1,500 feet. Soil is shale loam. 100 acres in meadow; 25 acres in timber, beech, maple and hemlock. 25 apple trees and some pear, plum and cherry. Well adapted to corn, oats, buckwheat, potatoes and hay. There are three miles of woven wire fence around this farm; some other wire and some rail fence. Good house, 34x34 feet with L, 19x38 feet. Three barns, carriage house, granary and other outbuildings. Spring water piped into house. Barn and fields are watered by springs. Price, \$9,000.00. Terms, easy payments. This farm has never changed hands. Good neighborhood. Long distance and local telephone. Cream route passes door. This farm can be divided nicely into two farms of 160 and 120 acres respectively. It is an easy down grade to railroad. Owned by Truman Brainerd. Address R. W. Beardslee, Manager, R. D., Owego, N. Y.

No. 32.—Farm of 75½ acres, located in Pike Township; four miles from Warren Center postoffice, R. D. No. 1; one and three-fourths miles from school, church and creamery. Roads are in fair condition. Considerable creek bottom land and high rolling land. Good soil. 25 acres in meadow; 35 acres in timber. About 40 acres tillable and more if cleared. About 35 apple trees. Adapted to oats, hay, buckwheat and potatoes. Much new wire fence; some good rail fence. Good ten-room house with new roof. Two barns, good chicken house, hog pen, etc. House is watered by well; barn and

fields, by creek and outlet of large pond. Price, \$1,600.00. Terms, cash. Never failing creek flowing from one end of the farm to the other. Three good springs. Stone quarry. Address Margaret Davis or Jennie D. Tompkins, Neath, Pa.

No. 33.—Farm of 50 acres, located in Springfield Township; three miles from Columbia Cross Roads, on line of P. A. R. R.; one and one-half miles from school and church, Methodist and Baptist; three miles from milk station. Highways are good with some hills. Troy, five miles distant, is the nearest large town and has a population of 2,000. May be reached by rail and highway. Surface is rolling with southern exposure. Altitude is about 2,000 feet. Red shale soil. Fourteen acres in meadow; five acres of timber, maple, ash and oak. Forty-four acres tillable. Orchard consisting of apple, pear, plum, prune, cherry, peach and quince trees. Well adapted to corn, oats, wheat, buckwheat, beans and potatoes. Good woven wire fences. Good 10-room house with attic, porches, bay window, etc. Barn, 30x40 feet, with basement and silo. This is a well arranged barn. Poultry houses, granary and ice house. House is watered by well and cistern; barn by well; fields by never failing stream. Price, \$2,600.00, including silage. Terms, \$1,000.00 cash and balance in payments. This farm can be arranged to keep ten or twelve cows and a team of horses. Fine farming community. Telephone and rural delivery. Address Mrs. Edna W. Dwyer, Troy, Pa.

No. 34.—Farm of 125 acres, situated in Athens Township; three miles from Athens postoffice, R. D. No. 26; railway station at Athens, on line of Lehigh Valley Railroad; one-half mile from school; church services held at school house and at Athens; three miles from creamery, milk station and condensing plant. Good roads. Surface is rolling. Good soil. Twenty-five acres in timber, oak, chestnut and pine. One hundred acres tillable. Fruit consists of apples, cherries, pears, peaches and berries. Adapted to general farm crops. Wire and rail fences, all in good condition. Eight-room house, in good condition. Good large barn, two large sheds, hen house, ice house, corn crib and wagon shed. Well at the door and water trough at the barn. Price, \$4,000.00. Terms, one-half down and balance in payments. This is a good farm. The buildings could not be erected for five thousand dollars. Address J. F. Rogers, Athens, Pa.

No. 35.—Farm of 110 acres, situated in South Creek Township; one and one-half miles from Snedekerville postoffice, R. D. No. 2; Snedekerville is on the line of the Pennsylvania Railroad; one mile from school and two miles from church; one mile from creamery. Good roads. Altitude, 1,500 feet. Clay and sandy loam soil. 95 acres tillable and 15 acres in timber. Apple, pear, cherry and plum orchard. Adapted to oats, buckwheat, corn and potatoes. Wire

fences. Eleven-room house. Barn, 30x60 feet. Well at house and spring at barn. Price, \$20.00 per acre. Terms, \$500.00 down and balance on time. Address C. W. Jelliff, R. D. No. 2, Snedekerville, Pa.

Bucks County.

No. 36.—Farm of 147 acres, located in Solebury Township; two and one-half miles from New Hope postoffice and railway station, on line of Philadelphia and Reading Railway; one mile from school, church and condensing plant. Good roads. New Hope has a population of 1,400. Surface is rolling. Twenty acres in meadow and eight acres in oak timber. 125 acres tillable. Some apple, peach and pear trees. Adapted to all kinds of farm crops and hay particularly. Outside fences are all good. Stone house with fourteen rooms, suitable for two families. Very large stone barn, well built and in good condition. House is watered by cistern and well; barn, by well. Fine spring below the house. Price, \$9,000.00. Terms, \$5,000.00 cash and balance on time. We desire to sell this farm in order to close an estate. Owners, Van Sant Estate. Address Mrs. R. C. Foulke, New Hope, Pa.

No. 37.—Farm of 65 acres, situated in Tinicum Township; one mile from Ottsville postoffice; five miles from railway station at Byram, on line of Belvidere Division, Pennsylvania Railroad; three-fourths mile from school and church, Lutheran and Reformed; one mile from creamery and one-half mile from milk station. Roads are good and almost level. Surface is smooth and rolling. Altitude, 300 feet. Gravel loam soil. Some hickory and oak timber. About 62 acres tillable. Several hundred fruit trees consisting of apple, cherry and pear. Adapted to grain and grass. Some fairly good wire fence. Good 6-room slate-roof house with cemented cellar. Barn, 40x43 feet. Wagon shed, corn crib, chicken house and other out-buildings. House and barn are watered by well. Price, \$4,500.00. Terms, \$2,500.00 cash and balance on mortgage. Splendid view from this farm. It is in sight of the Philadelphia and Eastern trolley line. Address W. S. Machtley, Ottsville, Pa.

No. 38.—Farm of 69 acres, situated in Upper Makefield Township; near Buckmanville postoffice; three miles from railway station at Wycombe, on line N. E. branch of the Philadelphia and Reading Railway; school near farm; Presbyterian and Baptist churches are two miles away; two miles from trolley and three miles from milk station. All stone highways except one mile which will be rebuilt within one year. Surface is rolling. Four acres of meadow; five acres of timber, mostly oak. Sixty acres tillable. Orchard with apple, pear, peach, grapes, blackberries, raspberries, etc. Adapted

to general farming, fruit and chickens. Post and rail, and wire fences. Stone house, 12 rooms, slate roof, good condition. Large bank barn with slate roof, 5 horse and 13 cow stalls. House and barn are watered by hydrant and well; fields, by stream. Price, \$7,500.00. Terms, part cash. Also, five room tenant house with slate roof. Fine view overlooking valley. Address George E. Krewson, Buckmanville, Pa.

No. 39.—Farm of 64 acres, situated in Milford Township; two and one-half miles from Pennsburg postoffice, R. D. No. 1; Pennsburg is on the line of the Philadelphia and Reading Railway; one-half mile from school; two miles from Lutheran and Reformed churches; three miles from condensing plant; two miles from creamery. Good roads. Surface is level. Clay loam soil. Forty acres in meadow; eight acres in timber, oak, chestnut and hickory. Fifty acres tillable. Orchard consisting of 15 apple, 15 cherry, 15 peach and some pear trees and grape vines. Well adapted to corn, wheat, oats, potatoes and hay. Good wire fences. One 8-room house and one 4-room house. Large bank barn—all buildings are in good condition. Water in house and barn. Fields are watered by spring. Price, \$4,500.00. Terms, \$3,000.00 cash and balance in payments. This is a good farm with good buildings. Old age is the reason for desiring to sell. Barn cost \$3,000.00. Address Preston Slauson, Pennsburg, Pa.

No. 40.—Farm of 25 acres, situated one mile from Fallsington postoffice, R. D. No. 1; Fallsington is on line of Pennsylvania Railroad; one mile from school; one mile from Methodist, Protestant Episcopal and Quaker churches; one mile from creamery and condensing plant. Good state road. Morrisville, Pa., is three miles and Trenton, N. J., four miles distant. Surface is level. Soil is sandy loam. Three acres in timber. Twenty acres tillable. Fifty fruit trees of various kinds. Adapted to fruit, vegetables and grain. Wood and wire fences. Good five-room house, 15x40 feet. Barn, 24x36 feet, wagon shed, corn crib, chicken house and pig pen. House and barn are watered by well. Price, \$3,500.00. Terms, \$1,500.00 cash and balance on time. Price includes stock, crops and implements. Title insured. Immediate possession. Address Joseph A. Schultz, R. D. No. 1, Bristol, Pa.

No. 41.—Farm of 100 acres, situated in Nockomixon Township; one-half mile from Revere postoffice; twelve miles from railway station at Doylestown; one-half mile from school; one mile from Reformed, Lutheran and Catholic churches; one mile from creamery, cheese factory and condensery. State highway. Near trolley. Surface is level. Good soil. Ten acres in meadow and seven acres in timber. About ninety acres tillable. Some apple, pear and peach

trees. Well adapted to wheat, rye, corn and general crops. Fences are in fair condition. Excellent large house. Very large barn. House and barn are watered by cistern. Price, \$5,000.00. Terms, easy. Address G. M. Grim, Ottsville, Pa.

No. 42.—Farm of 97 acres, located in Buckingham Township; one mile from Mozart postoffice; two and one-half miles from railway station at Rushland, on line of P. & R. R. R.; one mile from school; one and one-half miles from Presbyterian church and the same distance from creamery. Dirt roads. Doylestown is the nearest large town with a population over 3,000. May be reached by highway and trolley. Surface is part level and part rolling. Soil is shale and bottom land. Twenty acres in meadow. Seventy-five acres tillable. Thirty apple and some peach, pear, cherry and quince trees. Farm is adapted to hay, wheat, oats, corn and potatoes. Post and rail and wire fences. Stone house, eight rooms, slate roof. Barn, 25x75 feet. Wagon shed, hog house, etc. House and barn are watered by well and pump; fields by stream. Price, \$7,500.00. Terms, \$5,000.00 cash and balance on mortgage. This is a good farm and good buildings. Address W. H. Rockafellow, Mozart, Pa.

No. 43.—Farm of 95 acres, situated in Milford Township; five miles from Quakertown postoffice, R. D. No. 2; Quakertown is on the Philadelphia and Reading Railway; one-fourth mile from school; one mile from Reformed and Lutheran churches; one-eighth mile from creamery. Good roads. Surface is rolling. Red soil and clay loam. Ten acres in meadow; four acres in oak and hickory timber. Eighty acres tillable. Fifty apple and some cherry and pear trees. Adapted to grain and hay. Wire and post fences. One house, 20x30 feet; and another, 18x20 feet. Both in fair condition. Brick barn, 58x78 feet, good condition; sheds and hog pen. House is watered by well and spring; barn, by cistern; fields, by well. Price, \$7,500.00. Terms, \$4,000.00 cash and balance on time. Telephone and rural free delivery. Address Wm. J. Frederick, Quakertown, Pa.

No. 44.—Farm of 47 acres, located in Springfield Township; nine and one-half miles from Bethlehem postoffice, R. D. No. 2; three miles from railway station at Centre Valley, on line of Pennsylvania Railroad; three-fourths miles from school, church and creamery. Good roads. Hellertown with a population of nine hundred is four miles distant. Surface is rolling. Good limestone soil. Forty-four acres tillable. About 100 apple and some cherry trees. Adapted to corn, wheat, rye and oats. Good brick house with six rooms. Frame bank barn. House is watered by well and barn by spring. Price, \$1,600.00. Terms, \$1,000.00 cash and balance on mortgage. Some farm implements to go with farm. Address Frank S. Teel, Bethlehem, Pa.

No. 45.—Farm of 110 acres, situated in Buckingham Township; one-fourth mile from Mechanicsville; three miles from railway sta-

tion at Buckingham, on line of Philadelphia & Reading Railway; one and one-half miles from school; one-half mile from church. Good stone roads; four miles to Doylestown, the county seat. Surface is almost level. First class sandy loam soil. Ten acres in meadow; eighteen acres in timber. Eighty acres tillable. Apple, pear, cherry and quince trees. Adapted to general farming. New fence around meadow. Stone house, double parlors, dining room and kitchen, seven bed rooms. Stone barn; frame straw house; stabling for six horses and nine cows. Wagon shed, etc. Gravity water in kitchen and at barn; fields are watered by two lasting streams. Price, \$7,000.00. Terms, \$4,500.00 cash and balance on time at five per cent. This farm is in a high state of cultivation. Failing health is the reason for desiring to sell. Address Mrs. S. Jennie Scott, Lahaska, Pa.

Butler County.

No. 46.—Farm of 118 acres, situated in Mercer Township; one and one-half miles from Harrisville postoffice, R. D. No. 64; railway station at Harrisville, on line of Pittsburgh and Bessemer Railroad; near school; three miles from Presbyterian, Methodist and United Presbyterian churches; four miles from creamery and cheese factory. Highways are good. Grove City is the nearest large town. It is four miles away and has a population of 4,000. May be reached by rail and highway. Surface is level with good drainage. Altitude 1,400 feet. Good sandy and clay soil. Twenty acres in meadow; thirty acres in timber, chestnut, oak, hickory and maple—all good. Fruit consists of thirty apple, 25 peach, grape vines, etc. Adapted to wheat, corn, oats, buckwheat and potatoes. Rail and wire fences and in good condition. Two-story house, 28x32 feet, with kitchen, 12x16 feet. This house has porches and hall through center. House in good condition. Wagon shed, chicken house and hog pen. House is watered by spring; barn, by well; fields by trough and run. Price, \$55.00 per acre. Terms, \$2,000.00 cash and balance on time to suit purchaser. There is a three foot vein of coal on this farm and a maple sugar camp. Address W. H. Orr, R. D. No. 64, Harrisville, Pa.

No. 47.—Farm of 60 acres, located in Lancaster Township; seven miles from Evans City postoffice, R. D. No. 3; five miles from railway station at Harmony, on line of Baltimore and Ohio Railroad and on street car line; one mile from school; three miles from Presbyterian church. Good roads. Surface is level and rolling. Forty acres in meadow and twenty acres in timber. Forty acres tillable. Fifteen apple and five cherry trees. Adapted to oats, corn and wheat. Rail and board fences, in fair condition. Good house, 18x32 feet. Barn, 34x52 feet. Wagon shed and other necessary outbuildings, all in good condition. House is watered by spring; barn by small creek;

fields, by spring and creek. Price, \$2,700.00. Terms, half cash. Address John F. Frishkorn, R. D. No. 1, Prospect, Pa.

No. 48.—Farm of 80 acres, located in Cherry Township; two and one-half miles from West Sunbury postoffice, R. D. No. 3; five miles from railway station at Euclid, on line of Bessemer and L. E. Railway; one mile from school; two and one-half miles from United Presbyterian, Methodist and Presbyterian churches. Highways are good. Butler is the nearest large town and is fifteen miles distant. It has a population of 26,000 and may be reached by rail or highway. Surface is rolling. Altitude about 1,300 feet. Good clay and sandy soil. Sixteen acres in meadow; from fifteen to twenty acres in timber, oak and chestnut. About 60 acres tillable. Good apple orchard with choice varieties. Well adapted to wheat, corn, oats, buckwheat and farm crops generally. Wire and wood fences in fairly good condition. Good two story house, 26x36 feet, nine rooms, slate roof, large cellar. Good barn, 45x56 feet. Good outbuildings. House is watered by well; barn, by spring; fields by springs. Price, \$5,500.00. Terms, to suit purchaser. Good spring near house. Pump in kitchen. Front and back porches. Address Herr Porter, R. D. No. 3, West Sunbury, Pa.

No. 49.—Farm of 111 acres, located in Cranberry Township; five miles from Callery postoffice, R. D. No. 32; one-half mile from P. B. H. & N. C. Interurban Trolley line; one and one-half miles from school; one mile from Methodist church; one-half mile from milk station. Zelienople, eight miles away, is the nearest large town and has a population of 1,500. Surface is rolling. Altitude 900 feet. Good soil. Thirty-five or forty acres in meadow; about ten acres in timber, white oak. From 90 to 100 acres tillable. 50 apple and eight cherry trees. Adapted to wheat, rye, corn, oats, buckwheat, potatoes and trucking. The fences are mostly wire and in good condition. House is 22x45 feet and is in fairly good condition. Summer kitchen 18x24 feet. Barn, 36x54 feet. Wagon shed, hog pen, chicken house and sheep pen. Water is handy to house and barn. Fields are watered by running stream. Price, \$100.00 per acre. Terms, one-half cash and balance on mortgage. One small producing oil well on this farm. Trolley crosses one corner of the farm. Owners, Frederick Mohr's Heirs. Address George King, Zelienople, Pa.

No. 50.—Farm of 230 acres, situated in Worth Township; three and one-half miles from Slippery Rock postoffice, R. D. No. 4; six miles from railway station at Redmond, on line of P. R. R.; one-half mile from school; one-half mile from United Presbyterian church and two miles from Presbyterian church. Good state highway. Slippery Rock has a population of about 1,000. Surface is rolling. Sandy and clay soil. About 40 acres in meadow; 40 acres in timber, princi-

pally oak. About 175 acres tillable. Good assortment of apple and some peach trees. Adapted to all farm crops and has set of alfalfa. Principally wire fences and in good condition. Eight-room house, good condition. Bank barn, 40x70 feet, cemented basement. Wagon shed, corn crib, etc. Running water at house and barn. Fields are watered by springs and creek. Price, \$65.00 per acre. Terms, one-third cash and balance on time. This farm is in a fine state of cultivation. Meadows are seeded to clover and alfalfa. About fifty acres of limestone soil. Owners, M. M. Wilson & Company. Address W. Henry Wilson, Agent, Slippery Rock, Pa.

No. 51.—Farm of 128 acres, located in Slippery Rock Township; one mile from Slippery Rock; one mile from railway station at Redmond, on line of Pennsylvania Railroad; one mile from school; one mile from Presbyterian, Methodist and United Presbyterian churches. Good state highway. Slippery Rock is the seat of a normal school and has a population of over 1,000. Farming land is level and pasture land is rolling. Altitude 1,500 feet. Sandy loam soil. Twenty-two acres in meadow. Some timber consisting of maple, sycamore and beech. Fifty acres tillable. 150 fruit trees. Adapted to oats, corn, buckwheat, wheat, rye and potatoes. Fences are woven wire and barbed wire, all practically new. No house. Bank barn, 30x45 feet, good condition. House site is watered by never-failing spring of soft water; barn, by running water; fields, by springs, run and creek. Price, \$35.00 per acre. Terms, part cash and balance on mortgage to suit purchaser. This farm is a good producer. Grove City and Slippery Rock Trolley line is now under construction and is in sight of farm. Address W. C. Webber, Slippery Rock, Pa.

No. 52.—Farm of 112 acres, located in Middlesex Township; five miles from postoffice and railway station, on line of P. & W. Railroad; two miles from creamery and cheese factory. Highways are good. Surface rolling. Sandy loam soil. Thirty acres in meadow; five acres in timber, oak and cherry. One hundred acres tillable. Forty apple and some pear, cherry and plum trees. Adapted to oats, wheat, rye and all farm crops. Mostly wire fences and in fairly good condition. Good seven-room house. Barn, 36x64 feet, good condition. Outbuildings are in fairly good condition. Price, \$75.00 per acre. Terms, one-half cash and balance on mortgage. Address S. J. Mangel, R. D. No. 2, Valencia, Pa.

No. 53.—Farm of 36 acres, situated in Donegal Township; near Chicora postoffice, on line of B. & O. Railroad; one-half mile from school; one-half mile from Lutheran, Methodist and Catholic churches. Chicora has a population of about 1,000. Good roads. Part of this farm is level and part hilly. Divided into six fields. About 20 apple and some peach trees. Adapted to corn, oats, buckwheat and hay.

House and barn are watered by springs. Price, \$100.00 per acre. Terms, cash. The B. & O. Railway passes one end of this farm and the state highway the other. We desire to sell this farm in order to close an estate. Owners, B. Frederick Estate. Address Miss Louise W. Frederick, Administratrix, Chicora, Pa.

No. 54.—Farm of 122 acres, located in Marion Township; two miles from postoffice and railway station at Harrisville, on line of Bessemer and Lake Erie Railroad; one-half mile from school; two miles from Methodist and Presbyterian churches. Good public roads. Surface is rolling. Altitude about 1,300 feet. Twelve acres in meadow; sixty acres in timber, white oak, black oak, chestnut and maple. All the cleared land is tillable. About 50 apple trees and some fruit of other kinds. Adapted to wheat, rye, oats, corn, buckwheat and potatoes. Some wire and some rail fences. House, 16x24 feet, with kitchen, 16x20 feet. Stable, spring house and chicken house. House is watered by spring; barn, by trough. Price, \$35.00 per acre. Terms, \$2,000.00 cash and balance to suit purchaser. A part of this farm is underlaid with limestone. Address Thomas Hindman, Harrisville, Pa.

Cambria County.

No. 55.—Farm of 104 acres, situated in Barr Township; three-fourths mile from Nicktown; three and three-fourths mile from railway station at Spangler, on line of Cambria and Clearfield Division, Pennsylvania Railroad; three-fourths mile from school; three-fourths mile from Catholic church. Level public roads. Surface is rolling. Altitude about 2,200 feet. Black loam and clay soil. Twenty five acres in meadow; fifty five in timber, sugar maple, beech, cherry, etc. Fifty acres tillable. Sixty apple and some pear trees. Adapted to corn, oats, wheat and hay. Good wire fences. Fair house, 16x30 feet. Barn is 40x50 feet and is in fair condition. House and barn are watered by spring; fields, by creek. Price, \$4,000.00. Terms, one-half cash and balance on long term. This farm can be made so there will be eighty acres for cultivation and the balance for grazing. Good markets for produce. Address D. J. Houck, Hastings, Pa.

No. 56.—Farm of 80 acres, located in Munster Township; three miles from Cresson postoffice, R. D. No. 1; near railway station at Noel, on line of C. & C. Branch, Pennsylvania Railroad; one-fifth mile from school; three miles from Catholic, Presbyterian and Methodist churches. Highways are good. Cresson has a population of 3,000. Part of this farm is level and the rest is rolling and hilly. Altitude is 2,000 feet. Sand loam and clay bottom soil. Ten acres in meadow. Between 40 and 50 acres are tillable. Some apple trees.

Adapted to general farm crops. Rail and wire fences. Log house, five rooms, fair condition. Frame barn, 35x44 feet. Price, \$2,000.00. Terms, cash. Good location. Healthy climate. Price only includes surface. Address V. H. Noel, R. D. No. 1, Cresson, Pa.

No. 57.—Farm of 83 acres, located in Jackson Township; four miles from railway station at Conemaugh, on line of P. R. R.; one-eighth mile from school; one-eighth mile from Brethren church. Good stone roads. One and one-fourth miles from trolley line. Land under cultivation is rolling. Altitude 1,640 feet. Eight acres in meadow; twenty in timber, hemlock and hardwood. About forty acres tillable. Apple orchard with some peach, plum and grapes. Sand bottom adapted to small fruits and upland to general farm crops. Some of the fences are in fair condition. Good eight-room house. A fair barn with shed. Hog pen, chicken coop, etc. House and barn are watered by running spring. Price, \$3,500.00. Terms, cash. Good water power plant on this farm. This is a good chance for the right man and at a very low figure. Address James M. Singer, R. D. No. 1, Conemaugh, Pa.

No. 58.—Farm of 10 acres, located in East Taylor Township; one mile from East Conemaugh postoffice, on line of Pennsylvania Railroad. About ten minutes walk to Park Hill station; five cent fare from there to Johnstown or Conemaugh. Surface is hilly. Good soil. Adapted to fruit and poultry. Five-room house. Barn. Good never failing spring. Price, \$1,800.00. Terms, to suit purchaser. Address S. J. Plotkin, Johnstown, Pa.

Centre County.

No. 59.—Farm of 70 acres, situated in Liberty Township; two miles from Howard postoffice, R. D. No. 2; Howard is on line of Pennsylvania Railroad; one mile from school; one mile from Methodist church. State roads. Soil is limestone and sand. Twenty acres in meadow. Whole farm is tillable. Orchard consisting of apple, peach, pear and plum trees. Adapted to corn and hay. Good wire fence. House with nine rooms, good condition. Barn, 40x75 feet, shed, 30x30 feet. House is watered by well and cistern; barn by running stream. Price, \$6,000.00. There is a dower in this farm; balance on mortgage. Address C. W. Smith, Howard, Pa.

No. 60.—Farm of 135 acres, located in Liberty Township; six miles from Beech Creek postoffice, R. D. No. 2; six miles from railway station at Howard, on line of Bald Eagle Valley Railroad; one mile from school; two miles from Christian and Reformed churches. Good roads except a little rough. Surface is rolling. Red shale soil. Forty acres in timber, pine and chestnut, some ready for market. Ninety-five acres tillable. Fifty apple trees and some peach,

cherry and pear. Some wire fence and some post and rail. Nine-room house, good condition. Barn, 40x66 feet. House is watered by well; barn and fields, by small run. Price, \$2,700.00. Terms, cash. Address H. P. Robb, 118 South Fairview street, Lock Haven, Pa.

No. 61.—Farm of 106 acres, located in Curtin Township; six miles from Howard postoffice, R. D. No. 2; Howard is on line of Bald Eagle Valley Railroad; one mile from school; one and one-half miles from Christian and Reformed churches. Good roads but slightly hilly. Slopes principally toward the sun. Surface is part rolling and part hilly. Good red shale soil. Ten acres in meadow; twenty-five acres in timber; good white pine and chestnut. Eighty acres tillable. Fifty apple trees and some peach, pear and cherry. Adapted to corn, wheat, oats, rye and buckwheat. Wire and stone fences. Eight room house, good condition. Bank barn, 40x72 feet. Wash house, wagon shed and pig sty. House is watered by spring and barn by trough. Price, \$2,650.00. Terms, two-thirds cash, balance on mortgage. Address H. P. Robb, 118 South Fairview street, Lock Haven, Pa.

No. 62.—Farm of 95 acres, located in Curtin Township; three miles from Curtin postoffice, R. D. No. 1; two miles from railway station at Milesburg, on line of Pennsylvania Railroad; one-half mile from school; two miles from Methodist, Presbyterian and Baptist churches. Bellefonte, the county seat, is four miles away and has a population of about 6,000. One-half of this farm is level and the rest is hilly. Altitude 800 feet. Shale soil. Twelve acres in meadow; twenty acres in timber, oak and white pine, principally saw timber. Seventy acres tillable. Fifty apple and some cherry, peach, pear, plum, and quince trees, grape vines, shellbarks, etc. Well adapted to fruit. Principally wire fences. Frame house, 22x36 feet, fair condition. Log barn, 35x70 feet, fair condition. Granary, ice house and hen house. House and barn are watered by spring; fields, by creek. Price, \$2,300.00. Terms, cash preferred. Water and telephone. Rural mail delivery at door. Have planted 1,400 walnut trees from one year old to bearing age. Flag stone quarry on farm. Address George H. Musser, Curtin, Pa.

Chester County.

No. 63.—Farm of 120 acres located in Lower Oxford Township; one-half mile from Oxford postoffice, R. D. No. 5; Oxford is on line of Philadelphia, Baltimore and Washington Railroad; one and one-half miles from school; about one-half mile from Presbyterian, Baptist, Methodist and Catholic churches; three-fourths mile from milk station and creamery. Level slag road. Oxford has a population of 2,700. Surface is rolling. A few acres of timber, consisting of chestnut, oak and hickory. About 108 acres tillable. The fruit con-

sists of apple, pear, grapes, etc. Well adapted to wheat, oats, corn, potatoes and hay. Fine for dairying. Mostly post and rail fences; some wire, fairly good. Good brick house, eight rooms, 18x32 feet; frame L, 16x16 feet. Good barn, 56x88 feet; stabling for forty head. Wagon shed, granary, hog house, chicken house and tool house. House and barn are watered by pump; fields, by fine spring run. Price, \$100.00 per acre. Terms, one-half cash and balance on time at five per cent. This is a good farm and is located in a good neighborhood. Spring house with a splendid spring near dwelling. Address John M. Drennen, Oxford, Pa.

No. 64.—Farm of 108 acres, located one mile from Isbella postoffice; one mile from school; two miles from Methodist church; two miles from creamery and milk station. Good roads. Surface is level. Twenty acres in timber, oak and chestnut. Eighty acres tillable. Forty-five choice apple trees, small fruits, etc. Adapted to general farm crops. Ordinary rail and wire fences. House, 18x32 feet, kitchen attached, very good condition. Stone barn, 40x60 feet, good condition except roof. Wagon shed and other outbuildings. House and barn are watered by well; running water in all the fields. Price, \$5,000.00. Terms, ten per cent. down and balance on April 1, 1916. When possession will be given. We desire to sell this farm in order to close an estate. Owners, Jacob H. Morris' Heirs. Address Jacob Curley, Agent, Morgantown, Pa.

No. 65.—Farm of 78 acres, located in South Coventry Township; one mile from Coventryville postoffice, R. D. No. 2; four miles from railway station at Pottstown, on line of Philadelphia & Reading and Pennsylvania Railroads; one mile from school; creamery and cheese factory; one mile from Methodist and Baptist churches. Roads are slightly hilly. Pottstown has a population of 16,000. Highways are slightly hilly. Altitude 280 feet. Good mellow soil. Ten acres in meadow; eight acres in timber, white oak, black oak, chestnut, poplar and hickory. Whole farm is tillable except woodland. Some apple, peach, plum, pear and cherry trees. Well adapted to wheat, oats, corn and hay. Post and rail fences. Stone house with nine rooms. Stone barn with room for four horses and twelve cows. Hay house and carriage shed. House and barn are watered by pump and spring; fields, by stream. Price, \$5,200.00. Terms, cash and mortgage. This is a grand old homestead. Illness of owner is the only reason for desiring to sell. Address Annie Buckwalter, 326 Church street, Royersford, Pa.

No. 66.—Farm of 20 acres, located in Newlin Township; one-fourth mile from Embreeville postoffice; Embreeville is on the line of the Philadelphia & Reading Railway; one mile from school; two miles from church; one-fourth mile from milk station. Roads are hilly but

good. Surface is hilly. Altitude is 300 feet. Soil is loam and sand. Six acres in timber, oak, hickory and chestnut. 1,000 walnuts planted. Fourteen acres tillable. Good orchard consisting of choice varieties of fruit. Adapted to clover, vetch, corn, wheat, potatoes and melons. Post and rail fences and some wire, fair condition. Two houses, one with six rooms and the other with four rooms. Both houses are in good condition. Barn is insured for \$500.00. Spring water at house and barn by use of hydraulic ram. Price, \$1,800.00. Terms, \$300.00 cash and balance on time. Splendid location for fruit, trucking, chickens and dairy. One dozen English walnut trees. Address S. W. Morrison, M. D., Embreeville, Pa.

No. 67.—Farm of 88 acres, situated in East Nottingham Township; two and one-half miles from Oxford, R. D. No. 3; one mile from railway station at Nottingham on line of Pennsylvania Railroad; one mile from school and church; one mile from milk station; two and one-half miles from creamery. Highways are generally good. Oxford has a population of 3,000. Surface is rolling enough for good drainage. Altitude, 600 feet. Fifteen acres in meadow; four acres in timber; eighty acres tillable. Forty apple and some pear, plum, peach, cherry and quince trees. Adapted to corn, wheat, grass, oats and potatoes. Mostly wire fences and in fair condition. House, 25x30 feet, fair condition. Large new barn with straw shed. Wagon shed, corn crib, hog pen, etc. There is a tenant house and stable on this farm. House and barn are watered by well; fields, by spring and stream. Price, \$8,600.00. Terms, part cash and balance on time. Farm produces from 40 to 50 bushels of wheat per acre in good seasons. Near canning factory. Address J. S. Bayer, Oxford, Pa.

No. 68.—Farm of 145 acres, located in West Fallowfield Township; four miles from Cochranville postoffice, R. D. No. 1; four miles from railway station at Atglen on line of Pennsylvania Railroad; one-eighth mile from school; one and one-fourth miles from Methodist church; one-half mile from creamery. Good roads. Parkesburg is seven miles distant and has a population of 2,500. May be reached by both rail and highway. Surface is slightly rolling. Altitude, 550 feet. Good sandy loam and clay soil. Twelve acres in meadow; twenty acres in timber. 113 acres tillable. Orchard consisting of apple, pear, peach and cherry trees. Adapted to wheat, oats, corn, potatoes, tobacco and hay. Wire and post and rail fences, in fair condition. Brick house, 30x40 feet, nine rooms. Barn, 40x60 feet, straw shed, hog pen, corn crib and wagon shed. House and barn are watered by well; fields, by spring and run. Price, \$65.00 per acre. Terms, one-half cash and balance on time at five per cent. Yard and shade around the house. Address Norman Ankney, Cochranville, Pa.

Clarion County.

No. 69.—Farm of 82 acres, situated in Farmington Township; one-fourth mile from Scotch Hill postoffice, R. D. No. 1; three and one-half miles from railway station at Leeper, on line of B. & O. Railroad; one-fourth mile from school; one-fourth mile from Methodist and Presbyterian churches. Public roads and practically level. Sandy loam soil. Fifty acres in meadow; thirty-two acres in timber, oak, chestnut and pine. Fifty acres tillable. Fifty apple trees. Adapted to corn, oats, wheat, vegetables, etc. Rail fences. No house. Good barn, 32x56 feet. Buildings are watered by never-failing spring of splendid water. Price, \$1,200.00. Terms, cash. Leased for oil and gas at one dollar per acre per year. The adjoining farm is just the same size and can be bought at a reasonable price. This farm has a house but no barn. The two would make a splendid farm for livestock and poultry. Address John H. Kempf, R. D. No. 1, Kane, Pa.

No. 70.—Farm of 100 acres, located in Monroe Township; five and one-half miles from Sligo postoffice, R. D. No. 3; two and one-half miles from railway station at Reidsburg, on line of Franklin & Clearfield Railroad; three-fourths mile from school; one-fourth mile from Presbyterian and Lutheran churches. Highways are fair. About one-third is hilly and balance is level and rolling. Altitude is about 1,400 feet. Soil is clay and gravel loam. Thirty-two acres in meadow; fifteen acres in good timber, chestnut, oak and hickory. Eighty-five acres are tillable. Forty apple, 100 peach, 36 plum and 20 pear trees. Adapted to corn, wheat, rye and clover. Rail and wire fences, fair condition. House, 18x36 feet, kitchen, 16x20 feet; eight rooms, painted inside and out, good condition. Bank barn, 46x50 feet, wagon shed, spring house, hog pen, etc. House is watered by excellent spring; barn, by flowing trough; fields, by springs and small brook. Price, \$5,000.00. Terms, \$2,500.00 cash and balance on easy terms. Good gas well on farm and free gas for domestic purposes. Underlaid with coal. Limestone handy. I have burnt and used 250 tons of lime within the last ten years. Good community. Address F. W. Kirkpatrick, R. D. No. 3, Sligo, Pa.

No. 71.—Farm of 100 acres, located in Salem Township; five miles from Emlenton postoffice, R. D. No. 2; Emlenton is on line of A. V. Railroad; one mile from school; three-fourths mile from Lutheran, Methodist and Reformed churches; one-half mile from creamery. Surface is rolling. Altitude, 1,400 feet. Sandy and clay soil. Twenty acres in meadow; about ten acres in timber, oak, hickory and chestnut. Whole farm is tillable except woodland. Fine apple orchard, including cherries, plums and pears. Adapted to corn, clover, oats, wheat and potatoes. Rail, wire and board fences. House, 36x40 feet, well built and in good condition. Barn, 56x74 feet. Good outbuildings,

consisting of hog pen, chicken house, smoke house and washhouse. House is watered by well, barn, by well and spring; fields, by two springs. Price, \$8,750.00. Terms, one-third cash and balance on mortgage at five per cent. This is a fine dairy farm. Very pleasant section. High school. Cement walks to school and church. Address F. H. H. Knight, New Bethlehem, Pa.

Clearfield County.

No. 72.—Farm of 14 acres, located in Brady Township; three miles from Luthersburg postoffice, R. D. No. 1; two and one-half from railway station at Stanley, on line of B. R. & P. Railroad; one-half mile from school; two miles from Reformed church. Roads in this vicinity compare favorably with any in the county. DuBois, eight miles away, is the nearest large town and has a population of about 14,000. May be reached by rail, street car and highway. About one-half of this farm is level. Altitude, 2,100 feet. Sandy loam soil. Whole farm is tillable. Good orchard of choice fruit. Adapted to general farm crops. Line fences only. Good nine-room house, 20x30 feet with kitchen and pantry. Barn, 32x44 feet, built five years ago. Hog house, poultry house and shop. House is watered by well in basement; stream near barn. Price, \$1,300.00. Terms, cash. Telephone and one share of telephone stock included in sale. Address D. W. Hauck, Luthersburg, Pa.

No. 73.—Farm of 140 acres, situated in Burnside; four miles from Westover potsoffice, R. D. No. 1; three miles from railway station at Cherry Tree, on line of Pennsylvania and N. Y. C. & H. R. Railroads; one mile from school; one mile from Evangelical church; one mile from milk station. Good roads. Surface is rolling. Soil is heavy clay loam and fine slate, easily worked. Fifteen acres tillable; eighty acres in timber, hemlock, white pine, etc. Sixty acres cleared. 100 apple, 30 plum and 10 pear trees. Adapted to grain, grass and potatoes. Some wire fence and some pine stump fence. House, 20x28 feet, porch and pantry, good condition. Barn, 50x60 feet, built out of white pine, good stone foundation. Outbuildings are in good condition. House and barn are watered by spring. Price, \$5,000.00. Terms, three-fourths cash and balance on time. Eighty acres of this farm are in nice young timber, mostly white pine. House is valued at \$1,200.00 and barn at \$1,500.00. Address William I. Yingling, Westover, Pa.

No. 74.—Farm of 100 acres, located in Karthaus Township; two and one-half miles from Karthaus postoffice, on line of N. Y. C. & H. R. Railroad; near school and Lutheran and Methodist churches. Good roads. Surface is rolling. Altitude, about 1,300 feet. Soil is shale and naturally good. Thirty acres in meadow; ten acres in timber,

good oak and pine. About ninety acres are tillable. 30 apple, 20 cherry, 10 peach, grapes, berries and currants. Adapted to corn, buckwheat, potatoes and hay. Wire and rail fences, fair condition. House, 30x38 feet, good condition, nine rooms and bath. Barn, 36x50 feet with shed attachment. Wagon shed, wash house, corn crib, hog pen and chicken house—all in fair condition. House is watered by two wells and cistern; barn, by cistern; fields by never-failing spring. Price, \$3,000.00. Terms, one-half cash and balance secured. Price is for quick sale. This is the greatest bargain in this region. The house would cost between \$2,000 and \$2,500.00. Within one-half mile of state forestry reserve. Address L. M. Impson, Karthaus, Pa.

No. 75.—Farm of 60 acres, located in Union Township; one-fourth mile from Rockton postoffice; Rockton is on line of B. R. & P. Railroad; near school; one-fourth mile from Lutheran, Brethren and Mennonite churches. Six miles to Dubois which has a population of about 14,000. Surface is hilly. Altitude is 1,800 feet. Clay soil. Fifteen acres in meadow; twenty acres in timber, hemlock, oak and chestnut. About 60 apple, 50 cherry and 10 pear trees. Forty acres tillable. Adapted to rye, oats, potatoes and grass. Fences are not in good condition. Large house and barn, both in poor condition. No one living on the farm for five years. House is watered by pump; barn, by running water; fields, by springs. Underlaid with coal. Price, \$2,400.00. Terms, \$1,000.00 cash and balance to suit purchaser. Address W. H. Brubaker, Denton, Md.

No. 76.—Farm of 50 acres, located in Union Township; one and one-half miles from Rockton postoffice, R. D. No. 1; Rockton is on branch of B. R. & P. Railroad; one mile from school and one mile from Methodist church. DuBois is seven miles from farm. Surface is hilly. Altitude, 1,800 feet. Clay soil. Fifty acres tillable. Apple orchard, different varieties. Adapted to grass, corn, oats, rye and potatoes. No fences or buildings. Underlaid with coal. Fire clay. Watered by springs. Price, \$1,600.00. Terms, one-half cash and balance in one year. Owners, Brubaker Heirs. Address W. H. Brubaker, Denton, Md.

No. 77.—Farm of 50 acres, located in Union Township; two miles from Rockton postoffice, R. D. No. 1; on branch of B. R. & P. Railroad; one mile from school and three miles from Mennonite and Lutheran churches. Surface is level. Altitude, 1,800 feet. Sandy and clay soil. Five acres in timber, chestnut. About 35 acres tillable. 26 apple trees. Adapted to grass, rye, etc. No fences or buildings. Good spring. Price, \$500.00. Terms, cash. Make good stock farm. Lots of vacant land adjoining. Owners, Brubaker Heirs. Address W. H. Brubaker, Denton, Md.

No. 78.—Farm of 60 acres, situated in Lawrence Township; three miles from Clearfield, R. D. No. 4; three-fourths mile from railway station at Dimeling, on line of N. Y. C. Railroad; one mile from school and one mile from Methodist church. Good roads, part are state roads. Clearfield has a population of nearly 10,000. May be reached by rail or highway. Part of this farm is level with southern exposure. Some young oak timber. Surrounded by fine farms. No improvements. Good springs. This farm has not been cultivated for about forty years. Would make a good stock and poultry farm. Good markets. Price, \$400.00. Terms, cash, Address Mrs. Henrietta V. Stewart, 406 North Third street, Clearfield, Pa.

No. 79.—Farm of 1,022 acres of wild land, situated in Huston Township; about one mile from Penfield, on line of Buffalo & Susquehanna and Pennsylvania Railroads; two miles from school; two miles from Methodist, Presbyterian and Catholic churches; two miles from milk station. Roads are hilly but good. Surface is rolling and part level. Altitude is about 1,400 feet. Fertile soil. Partly covered with saplings. Some timber consisting of hemlock, birch, beech, maple and chestnut. Whole tract can be cultivated if cleared. Adapted to oats, wheat, potatoes and grass. Ideal for grazing. Numerous springs and small streams. Price, \$5.00 and \$6.00 per acre. Address J. E. Fry, 214 Park avenue, DuBois, Pa.

No. 80.—Farm of 116 acres, situated in Cooper Township; one and one-fourth miles from Drifting postoffice; six miles from railway station at Winburne, on line of N. Y. C. & H. R. Railroad; near school; one-half mile from Catholic church. Level state roads. Surface is smooth and rolling. Good light sandy loam soil. About twenty acres in meadow; forty-five acres in timber, white oak, red oak, second growth. About seventy acres tillable. 100 apple trees, thirty years old, assorted varieties, peaches, pears, grapes, etc. Adapted to wheat, rye, oats, corn, hay, potatoes, buckwheat and fruit. Rail and wire fences, all in good condition. Frame house, two story, sixteen rooms, painted last year and is in splendid condition. Barn, 50x50 feet, new roof last year. Out kitchen, hog pen and chicken house. House is watered by good well; fields, by springs. Price, \$6,000.00. Terms, \$3,000.00 cash and balance on mortgage to suit purchaser. Underlaid with coal. Owner, Mrs. Catherine Myers. Address Dr. W. C. Raymond, Lilly, Pa.

Clinton County.

No. 81.—Farm of 200 acres, situated in Crawford Township; four miles from Loganton postoffice, R. D. No. 2; six miles from railway station at Pine, on line of P. & E. Railroad; three-fourths mile from school; three-fourths mile from Lutheran church. Some of the roads

are hilly but in fair condition. Lock Haven, the county seat, is twelve miles away and has a population of 8,000. May be reached by rail and highway. Part of surface is smooth and level and part is rough. Soil is sandy loam and gravel. 100 acres in meadows; 100 acres in timber, chestnut, oak and pine. About 100 acres tillable. 75 apple, 25 plum, 15 quince, grapes in abundance, etc. Adapted to wheat, rye, corn, oats, buckwheat and potatoes. Wire fences, need some repairs. Two story, nine room house, fair condition. Barn, 40x48 feet with straw shed attached. Poultry house, carpenter shop and wood shed. House and barn are watered by well; fields, by spring. Price, \$2,500.00. Terms, cash. This farm is a good bargain. Address D. E. Herman, Loganton, Pa.

No. 82.—Farm of 50 acres, located in Crawford Township; four miles from Loganton postoffice, R. D. No. 2; Loganton is on line of W. S. & L. Railroad; three-fourths mile from school and the same distance from Lutheran and Evangelical churches; four miles from creamery. Good roads but somewhat hilly. Surface is smooth and slopes to the east. Good sandy soil. About thirty-eight acres tillable. 50 apple and some plum and pear trees. Adapted to general farm crops. No fences. Good log house, weather-boarded and plastered. Good barn. Other buildings are in fair condition. House and barn are watered by well. Price, \$1,000.00. Terms, cash. Considered a very healthy community. Address J. E. Snook, Loganton, Pa.

No. 83.—Farm of 65 acres, located in Greene Township; six miles from Loganton postoffice, R. D. No. 6; two miles from railway station at Carroll, on line of White Deer & Loganton Railway; one-half mile from school and church; six miles from creamery. Surface is rolling. Gravel soil. Five acres in timber, oak, pine and chestnut. Sixty acres tillable. 80 apple, 25 peach, 6 pear trees. Adapted to rye, corn and oats. Fairly good house, 25x30 feet. Barn. House and barn are watered by well. Price, \$800.00. Terms, cash. Address W. H. Beck, Loganton, Pa.

Columbia County.

No. 84.—Farm of 73 acres, located in Beaver Township; two and one-half miles from Zions Grove postoffice, R. D. No. 1; two and one-half miles from railway station at Raricks, on line of P. & R. Railway; one-fourth mile from school; five minutes from United Evangelical church. Surface is sloping enough for good drainage. Can use binder in every field. Red shale soil. Young timber consisting of chestnut, pine, oak and hemlock. 130 apple, some plum, pear, walnut and hickory nut trees. Adapted to corn, oats, wheat, rye and potatoes. No fences. House, 15x42 feet, six rooms, fair condition. Barn, 42x43 feet. Straw shed, poultry house and pig pen. House and barn

are watered by spring. Price, \$5,800.00. Terms, one-half cash and balance on long time. About twelve acres for pasture. Spring water stream stocked with trout. Address A. W. Diehl, Zions Grove, Pa.

No. 85.—Farm of 42 acres, situated in Greenwood Township; three miles from Benton, on line of B. & S. Railroad; one-half mile from school and three miles from Methodist, Christian and Presbyterian churches. Very good roads. Benton has a population of 900. Surface is smooth. largely rolling. Gravel soil. Thirty-seven acres tillable. Some old apple trees and some good chestnut trees. Adapted to buckwheat, oats, corn, etc. No fences or buildings. Two good springs. Price, \$300.00. Terms, cash. Address Byron S. Keller, Benton, Pa.

No. 86.—Farm of 220 acres, located in Jackson Township; six miles from Benton; two miles from railway station at Laubach, on line of B. & S Railroad; one mile from school; two miles from church. Fairly good roads. Some hills and some flat land. Some limestone. No buildings or fences. Springs and creek. Price, \$800.00. Terms, cash. This farm is covered with young timber. Trout stream. Good investment. Owner, Sheridan Fretz. Address Byron S. Keller, Benton, Pa.

Crawford County.

No. 87.—Farm of 105 acres, situated in Bloomfield Township; four miles from Centerville postoffice, R. D. No. 2; Centerville station is on line of Pennsylvania Railroad; five minutes from school; one and one-half miles from Congregational and Methodist churches; one and one-half miles from creamery; two and one-half miles from cheese factory. Fine dirt roads. Union City, 8 miles away, is the nearest large town and has a population of nearly 5,000. Surface is nearly level. Soil is principally gravel loam. Twenty-five acres in meadow; five acres in timber, hard sugar maple principally. About forty acres tillable. Good orchards or choice fruit. Adapted to oats, corn, wheat, buckwheat, clover, timothy, etc. Wire fences, fair condition. Frame house, eleven rooms, in fair condition. Barn, 40x50 feet, basement, fair condition. New silo 12x28 feet. House and barn are watered by drilled well; fields, by springs. Price, \$4,000.00. Terms, cash. There is a sugar bush of 600 trees. Good community. Telephone connections. Address H. E. Amey, R. D. No. 2, Centerville, Pa.

No. 88.—Farm of 100 acres, situated in Hayfield Township; seven miles from Meadville, the county seat, R. D. No. 2; four miles from railway station at Dickinsonburg, on line of R. B. & L. E. Railroad; near school; one mile from Methodist and United Brethren churches. Good roads. Surface is slightly rolling. Altitude, 1,450 feet. Clay

loam soil. Forty acres in meadow; twenty-five acres in timber, maple, chestnut, oak, etc. Seventy acres tillable. Apple orchard. Adapted to corn, wheat, oats and hay. Good rail fences. Large house and in good condition. Large barn, fair condition. Buildings and fields are watered by wells. Price, \$4,000.00. Terms, to suit purchaser. This farm has no waste land and is in a good neighborhood. Desires to sell because of age and poor health. Address D. H. Lefever, R. D. No. 2, Meadville, Pa.

No. 89.—Farm of 153 acres, situated in Hayfield Township; five miles from Meadville, R. D. No. 2; six miles from railway station at Meadville, on line of Erie Railroad; three-fourths mile from school; two and one-fourth miles from Methodist church; four miles from creamery and cheese factory. Good roads. Altitude, 1,460 feet. Clay loam soil. Eighty acres in meadow; thirteen acres in timber, maple, beech, chestnut, oak, etc. 140 acres tillable. 50 maple trees, cherry, grapes, strawberries, raspberries, etc. Adapted to corn, wheat, oats, and hay. Good rail fences. One large house and one medium size house. Two barns, good condition. Outbuildings are in good condition. House and barn are watered by wells; fields, by well and springs. Price, \$8,000.00. Terms, to suit purchaser. No wasteland. Farm is in high state of cultivation. Address D. H. Lefever, R. D. No. 2, Meadville, Pa.

No. 90.—Farm of 38 acres, located in East Fairfield Township; one mile from Cochranston postoffice, on line of Erie Railroad; one-fourth mile from school; one mile from Presbyterian, United Presbyterian, Methodist and German Reformed churches; five miles to cheese factory. Highways are in good condition. Meadville, the county seat, is nine miles away and has a population of 15,000. Surface is level. Rich loam and clay soil. Nine acres cleared and cultivated and the balance of the farm has only recently been cleared and not yet cultivated. Plenty of timber just cut to build moderate sized house and barn. This is virgin soil and a great berry growing section. Would make a splendid chicken farm. Never-failing spring on the premises and a small spring run. Price, \$1,200.00. Terms, cash. This is a bargain and is worth looking into. Address Frank L. Roche, Cochranston, Pa.

No. 91.—Farm of 50 acres, situated in Conneaut Township; fifty rods from Center Road postoffice and the same distance from railway station at Summit, on line of E. & P Railroad; near school and one mile from church; three miles from creamery and cheese factory. Good level roads. Surface is slightly rolling. Good quality clay loam soil. Twelve acres in meadow; ten acres in timber, beech and maple. Forty acres tillable. Good apple, pear and peach orchard. Adapted to wheat, oats, corn and farm crops generally. Rail and wire fences.

Two story frame house, eight rooms, good condition. Bank barn, 40x45 feet, good condition. Outbuildings are in good condition. House and barn are watered by well. Fields are well watered. Price, \$3,500.00. Terms, one-half cash and balance on mortgage at five per cent. A very desirable location. Buildings stand back from road. Railroad on west side of farm. The price is one-third below value. Address Mrs. James N. Corey, Conneautville, Pa.

No. 92.—Farm of 190 acres, situated in Rockdale Township; six and one-half miles from Cambridge Springs, R. D. No. 28; three and one-half miles from railway station at Millers, on line of Erie Railroad; one mile from school; one and one-half miles from Baptist church; one mile from creamery; two miles from cheese factory. Surface is rolling. Gravel and loam soil. Forty-five acres in meadow; forty-five acres in hardwood timber, maple, beech, chestnut, etc. About fifty acres tillable. Apple, peach and pear orchard. Adapted to potatoes, corn, wheat, oats, rye and hay. Mostly barbed-wire fences, good condition. Eleven room house, slate roof, good condition. Basement barn 42x76 feet, metal roof. Two other barns, 30x40 feet, good condition. Granary, hen house, pig pen, etc. House is watered by well; small stream near barn; fields are watered by spring that never fails. Price, \$50.00 per acre. Terms, one-half cash and balance on time. One of the best dairy farms in the township and a good grain and hay farm. Address Melvin Alford, Union City, Pa.

No. 93.—Farm of 72 acres, located in Woodcock Township; one and one-half miles from Meadville, R. D. No. 9; one and one-half miles from railway station at Saegerstown, on line of Erie Railroad; three-fourths mile from school; one and one-half miles from church; three miles from cheese factory; one and one-half miles from condensing plant. Black and yellow loam soil. Ten acres in meadow; three acres in timber, second growth maple, sixty nine acres tillable. Adapted to general farm crops, particularly hay. Fences are in good order with surplus of material. Good house, 16x32 feet, with addition and kitchen. Barn, 32x50 feet, with lean-to. Extra good hen coop, etc. House is watered by well; barn, by spring. Price, \$3,500.00. Terms, \$2,000.00 cash and balance on time. 45 cherry, 30 apple and 20 pear trees. It is about 15 minutes walk to trolley line. Address J. W. Harth, Meadville, Pa.

No. 94.—Farm of 105 acres, located in South Shenango Township; two miles from Espyville Station postoffice, R. D. No. 43; Espyville Station is on line of Pennsylvania Railroad; two and one-half miles from central school; two miles from United Presbyterian and Methodist churches; two miles from creamery, cheese factory and milk station. Good level roads. Linesville, four miles away, is the nearest large town and has a population of 1,000. Surface is rolling. Al-

titude, 1,000 feet. Clay and black loam soil. Twenty-four acres in meadow. Fifty-five acres tillable, balance in pasture but can be plowed. Apple, plum and peach orchard. Adapted to hay, wheat, oats, potatoes and buckwheat. Wire and rail fences, in fair condition. House, 24x32 feet, eight rooms, newly painted and in good condition. Good barn, 40x56 feet, hen house, pig pen, buggy house, fair condition. House is watered by well; barn, by well and wind mill. Price, \$6,000.00. Terms, one-half cash and balance to suit purchaser. Excellent dairy and stock farm. Address H. M. Hayes, Espyville Station, Pa.

No. 95.—Farm of 45 acres, situated in Woodcock Township; four and one-half miles from Meadville, R. D. No. 9; one mile from railway station at Saegertown, on line of Erie Railroad; one-fourth mile from Methodist, Lutheran and German Reformed churches; one mile from cheese factory, milk station and milk condensery. Good roads. Surface is rolling. Gravelly loam soil. Twenty-six acres in meadow; one acre in timber, sugar maple. Forty-three acres tillable. Thirty-five plum and twenty-five apple trees. All crops do well, especially grain and potatoes. Wire and rail fences. Ten-room house, slate roof. It would cost \$3,500.00 to build. Barn, 32x56 feet, with shed. Good wagon shed, shop, hen house, etc. House is watered by well and running water; barn, by well; fields, by running water in pasture. Price, \$3,600.00. Terms, one-half cash and balance on mortgage at five per cent. Splendid view overlooking French Creek Valley. Large shade trees at house. Railroad tracks near house. Address Frank Trace, R. D. No. 9, Meadville, Pa.

No. 96.—Farm of 58 acres, located in Bloomfield Township; one mile from Riceville; five miles from railway station at Centerville, on line of Pennsylvania Railroad; one mile from school; one mile from Methodist, Baptist and Congregational churches; one mile from creamery and cheese factory. Good state highway. Union City is the nearest large town. It is nine miles away and has a population of 5,000. Surface is rolling. Gravelly loam soil. Sixteen acres in meadow; fifteen acres in timber, good sugar maple. Forty acres tillable. Ten apple trees. Adapted to hay, oats, potatoes and dairying. Wire fences, fair condition. Good house, 30x32 feet. Barn, 42x60 feet with basement. Hog house, chicken house, sugar house and shop, all in fair condition. House and barn are watered by well; fields by springs. Price, \$3,000.00. Terms, one-fourth cash and balance on time. Good fishing. Twelve miles from Cambridge Springs, noted health resort. Address Jesse Martin, Riceville, Pa.

No. 97.—Farm of 86 acres, situated in Hayfield Township; seven miles from Meadville, R. D. No. 1; three and one-half miles from railway station at Saegerstown, on line of Erie Railroad; twenty

rods from school; one and one-half miles from Baptist, Methodist and Lutheran churches; one and one-half miles from cheese factory; three and one-half miles from creamery, milk station and condensery. Good dirt roads. Saegerstown has a population of 1,200. Surface is slightly rolling. Good gravel soil. Fifty acres in meadow; ten acres in timber, maple, beech, hemlock and elm. Seventy acres tillable. Orchard, consisting of apple, peach, plum, cherry and pear trees. Adapted to general farm crops. Sixty rods of nearly new woven wire fence, balance good rail and board. Seven-room house, fair condition. Bank barn, 36x60 feet with L, 30x45 feet. Stables are concreted. Good corn crib, wood house and hog pen. House is watered by well on porch; water is piped from spring to barn; fields are watered by never-failing springs. Price, \$3,000.00. Terms, one-half cash and balance on mortgage. This farm is worth more than I am asking for it. Address O. O. Maloney, 643 Madison avenue, Meadville, Pa.

No. 98.—Farm of 40 acres, situated in Summerhill Township; two miles from Conneautville postoffice, R. D. No. 31; one and one-half miles from railway station at Dicksonburg, on line of Bessemer Railroad; one-fourth mile to school; one and one-half miles to church; two miles from creamery. Good level roads, well drained. Surface is rolling and level. Black loam soil. Fifteen acres in meadow; ten acres in timber, maple and beech. Thirty acres are tillable. Forty apple trees and fruit of all kinds. Adapted to corn, oats, wheat, hay and alfalfa. New wire fence and some rail fences. Nine-room house with large cellar. New bank barn, 38x40 feet. Hog house, chicken house, wagon shed and other buildings. Well in kitchen and one near the barn. Running water in pasture. Price, \$100.00 per acre. Terms, \$2,500.00 cash and balance on long term. This price includes lot of personal property. Farm is in good condition. Address Philip J. Bauer, R. D. No. 31, Conneautville, Pa.

No. 99.—Farm of 75 acres, located in East Mead Township; four and one-half miles from Meadville, R. D. No. 7; Meadville is on Bessemer and Erie Railroads; one-half mile from school; one-half mile from Baptist and Catholic churches; four miles from cheese factory. Good roads. Surface is part rolling and part level. Twenty-five acres in timber, beech, maple, etc. Twenty-five acres tillable. Adapted to general farm crops. Wire and rail fences, fair condition. No buildings. Price, \$900.00. Terms, cash. Good dairy farm. Good community. Address P. N. Winters, R. D. No. 7, Meadville, Pa.

No. 100.—Farm of 63 acres, located in Beaver Township; two miles from Shadeland postoffice, R. D. No. 2; Shadeland is on line of P. B. & L. E. Railroads; forty rods from school; two miles from church; two miles from creamery, cheese factory, milk station and

condensery. Good level and sandy roads. General surface is level. Black clay soil. Forty-six acres in meadow; seventeen acres in timber. Forty-six acres tillable. Twenty apple trees. Adapted to hay, oats, corn and buckwheat. Good wire fences. House, 24x36 feet, cemented cellar, good. Barn, 36x50 feet, good condition. Granary, hog house and hen house. House is watered by well and cistern; barn, by well; fields by running water. Price, \$3,150.00. Terms, to suit buyer. This farm is in high state of cultivation and is adapted to all kinds of grains. House has ten rooms and is in first class condition. Cash price is \$3,000.00. Address Alexander Coyle, R. D. No. 2, Shadeland, Pa.

No. 101.—Farm of 160 acres, situated in Hayfield Township; four and three-fourths miles from Meadville, R. D. No. 2; Meadville is on the line of the Erie and Bessemer Railroad; two miles from electric car line; one hundred yards from school; two miles from Methodist and Brethren churches. Gravel and loam soil. Thirty acres in meadow; fifty acres in timber, hickory and black ash. Ninety apple trees. Adapted to corn, potatoes, oats, hay and wheat. Rail fences, fair condition. Frame house with seven rooms, fair condition. Bank barn, 35x70 feet; another barn, 32x32 feet, granaries, smoke house, chicken coop, etc. Pump at the door. Running spring water in barn yard. Price, \$6,000.00. Terms, \$2,000.00 cash and balance on mortgage. Always farmed by owner. Crops fed on farm. Pleasant location on state road. Address L. A. Betts, R. D. No. 2, Meadville, Pa.

No. 102.—Farm of 90 acres, located in Cussewago Township; six miles from Cambridge Springs, R. D. No. 3; four miles from railway station at Venango, on line of Erie Railroad; one-half mile from school; two and one-half miles from Methodist, Baptist and Brethren churches; one-half mile from cheese factory. Roads are good. Surface is slightly rolling. Soil is clay, gravel and black muck. Twenty-three acres in meadow; forty-five acres in timber and pasture. Forty-five acres tillable. Apple, pear and peach orchard. Adapted to corn, wheat, oats, rye, buckwheat, etc. Good rail and wire fences. Eight-room cottage house. Barn, 36x75 feet, with granary. Hog house with cement floor. House and barn are watered by wells; fields, by spring in pasture. Price, \$4,500.00. Terms, \$2,000.00 cash and balance on time. Address E. W. Wright, R. D. No. 3, Cambridge Springs, Pa.

No. 103.—Farm of 130 acres, located in Cambridge Township; one-fourth mile from Venango postoffice, on line of Erie Railroad; one-fourth mile from school; one-fourth mile from Methodist, Presbyterian and Lutheran churches; one-fourth mile from cheese factory. Good gravel road. Cambridge Springs, three miles away, is the nearest large town. Surface is part rolling and part level. Altitude,

900 feet. Sandy loam soil. Thirty acres in meadow; 128 acres tillable. Apple orchard consists of 35 Greenings, 30 Baldwin and 40 mixed varieties. Adapted to corn, wheat, oats, potatoes and truck. New wire fence. Eleven room house, new roof, good condition. Barn, 50x60 feet, with basement and cement floors. Large shed. House and barn are watered by wells; fields, by creek in pasture. Price, \$9,000.00. Terms, cash. Large dairy, and milk is shipped to Meadville by trolley. Farm has never been rented. Address J. E. McKay, 1672 Gopher street, Pittsburgh, Pa.

No. 104.—Farm of 21 acres, located in Hayfield Township; one-fourth mile from Saegerstown, R. D. No. 16; on line of Erie Railroad; one-fourth mile from school; one-fourth mile from Methodist, Reformed and Lutheran churches; one-fourth mile from creamery, milk station and condensing plant. Good roads except a little hilly. This farm is five miles from Meadville, the county seat. Surface is nearly level. Altitude, 500 feet. Twelve acres in meadow; two acres in timber, chestnut. Eighteen acres tillable. 30 peach, 20 plum and 12 apple trees. Fences need repairing. Cottage house with seven rooms. Barn, 30x40 feet, fair condition, corn crib and hog house. Running water at house; stream in pasture. Price, \$2,000.00. Terms, cash. Address M. J. Shoppard, R. D. No. 16, Saegerstown, Pa.

No. 105.—Farm of 165 acres, situated in Randolph Township; eight miles from Meadville, R. D. No. 8; Meadville is on the line of the Erie and Bessemer Railroads; one mile from school; two and one-half miles from Methodist and Congregational churches; two and one-half miles from cheese factory. Good roads. Surface is mostly level. Gravel soil. 57 acres in meadow; 15 acres in timber. 100 acres tillable. 100 apple, 35 cherry, 42 pear, 42 plum and 25 peach trees. Currants, raspberries, blackberries, etc. Well adapted to wheat, corn, oats and hay. Rail and wire fences, in fair condition. Good house, two porches, painted, etc. Bank barn with silo. Corn crib, hog pen and chicken house. House and barn are watered by cistern and wells; spring run traverses farm. Price, \$5,500.00. Terms, part cash and balance to suit purchaser. This farm is in good state of cultivation. Address Albert N. Griggs, R. D. No. 8, Meadville, Pa.

Cumberland County.

No. 106.—Farm of 91 acres, situated in Frankford Township; eight and one-half miles from Newville postoffice, R. D. No. 3; five and one-half miles from railway station at Kerrsville, on line of Cumberland Valley Railroad; one-fourth mile from school; three-fourths mile from Church of God; two and one-half miles from creamery. Surface is from level to rolling. Gravel soil. Ten acres in meadow; eighteen acres in timber, oak, maple and locust. Apple orchard with

some pear and cherry trees. Adapted to corn, wheat, oats, rye, potatoes and fruit. Principally wire fences, some post and rail, good. Good house, 24x28 feet; L, 14x20 feet. Good new barn, 40x58 feet. Wagon shed, hog pen and corn crib. House and barn are watered by wells; running water in four fields. Price, \$3,500.00. Terms, payable, April 1, 1916. Telephone in house; one-fourth mile to store; two and three-fourths miles to village of 100 population; rural mail daily at door. Address J. S. Darr, 324 N. College street, Carlisle, Pa.

No. 107.—Farm of 140 acres, situated in Silver Spring Township; four miles from Mechanicsburg postoffice, R. D. No. 6; one and one-half miles from railway station at New Kingston, on line of C. V. R. R.; one mile from school; one mile from Lutheran and Evangelical churches; one-fourth mile from creamery. Good state roads. One-half of this farm is level and other half is rolling. Limestone and slate soil. Whole farm is tillable. 225 apple and some plum, pear, apricot and quince trees. Well adapted to wheat, hay, corn, oats and alfalfa. Wire and post fences. Nine-room house, in good condition. Barn is 70 feet long with wagon shed at one end, fair condition. Hog pen, etc. Water in house and at barn. Some of the fields have water in them. Price, 14,000.00. Terms, cash or its equivalent. This farm is eleven miles from Harrisburg. Two sets of buildings and can be divided into two farms. Address S. E. Raudabaugh, R. D. No. 6. Mechanicsburg, Pa.

Dauphin County.

No. 108.—Farm of 145 acres, located in Rush Township; three miles from Tower City postoffice, R. D. No. 1; Tower City is on the line of Philadelphia & Reading Railway; one-fourth mile from school; three miles from churches. Good clay roads. Surface is level. Loam and red shale soil. Twenty-five acres in meadow; fifty acres in timber. About 90 acres tillable. Apple, cherry, pear and plum trees. Adapted to wheat, corn, hay, potatoes and oats. Good wire fences. Two houses, one just built having six rooms and the other has seven rooms. Bank barn 34x75 feet. All necessary out-buildings, fair condition. House and barn are watered by running stream. Price, \$4,500.00. Terms, easy. Good markets. This proposition will bear investigation. Address Jacob Gehres, R. D. No. 1, Tower City, Pa.

No. 109.—Farm of 96 acres, situated in Upper Paxton Township; one mile from postoffice; one mile from railway station at Mahantango, on line of Northern Central Railroad; one-half mile from school; one and one-half miles from creamery. Public roads, hilly but good. Millersburg, five miles away, has a population of 3,000.

Surface is hilly. Gravel and loam soil. About 70 acres in meadow; 23 acres in timber, chestnut, oak etc., second growth. 70 acres tillable. 225 apple, 40 pear and 20 plum trees. Adapted to hay, oats, wheat, rye, potatoes and buckwheat. Nine room house, fair condition. Bank barn, 40x60 feet, fair. Hog pen, granary, chicken house and wagon shed. House is watered by well; barn, by well and spring; fields, by running water. Price, \$3,000.00. Terms, cash and time. Address A. P. Lentz, 3514 Wrightwood avenue, Chicago, Ill.

No. 110.—Farm of 105 acres, situated in Lower Paxton Township; two miles from Linglestown postoffice; eight miles from Harrisburg; two miles from school and church. Good roads. Surface is generally level. Loam soil. Five acres in meadow; four acres in timber, oak and hickory. Ninety acres tillable. Fruit: 30 apple, 12 pear and 12 cherry trees. Adapted to hay, corn, oats, wheat and rye. Mostly post and rail fences, good. Brick house, nine rooms. Barn, 45x90 feet. New shed and necessary outbuildings. House and barn are watered by pump; fields, by springs. Price, \$84.00 per acre. Terms, to suit purchaser. Beaver Creek runs through the farm. Large spring near the house. Address A. U. Reese, Executor, Box 1, Harrisburg, Pa.

Elk County.

No. 111.—Farm of 50 acres, located in Benzinger Township; one and one-fourth miles from St. Marys, R. D. No. 1, on line of P. E. & P. S. N. Railroad; one and one-fourth miles from school, church, creamery and milk station. Surface is rolling. Soil is clay loam and gravel. Thirty-five acres in meadow; fifty acres tillable. Apple, cherry, plum and pear orchard. Adapted to all farm crops. Good wire fences. L. house, 18x24 and 16x18 feet, good condition. Barn, 40x50 feet. New chicken house, etc. Water in house and barn. Fields are watered by springs and brook. Price, \$80.00 per acre. Terms, one-half cash and balance on time. Ten minutes walk to Elk County Fair Grounds. Farm is underlaid with coal and good clay. Address August Fledderman, St. Marys, Pa.

No. 112.—Farm of 160 acres, situated in Ridgway Township; three miles from Ridgway, R. D. No. 1; on line of B. R. & P. Railroad; one-half mile from school; three miles from church and milk station. Fairly good dirt roads. 100 acres level and 60 acres rolling. Altitude is about 1,300 feet. Clay and shale soil. 40 acres in meadow; whole farm is tillable. Adapted to hay and oats. Wire fences, fairly good. Eight room house, nearly new. Main barn, 40x80 feet, built ten years ago; tool barn, 30x40 feet. Buildings are watered by wells and fields by running water. Price, \$15,000.00. Terms, \$3,000.00 down on contract and balance upon agreement. This price includes

all stock, tools, etc. All registered and grade Holstein cattle. This farm cost me, including stock and implements, \$35,000.00. Address Perry R. Smith, Ridgway, Pa.

Erie County.

No. 113.—Farm of 110½ acres, located in Elk Creek and Girard Townships; three miles from Cranesville postoffice, R. D. No. 1; three miles from railway station at Platea, on line of Bessemer Railroad; one and one-half miles from school and church; two miles from creamery and cheese factory. Surface is rolling. Clay loam soil. Thirty acres in meadow; forty acres in pasture; seventy acres tillable. 100 apple and some peach and plum trees, grape vines, raspberries, etc. Adapted to hay. Five room house, in fair condition. New basement barn, tool house, etc. House and barn are watered by wells; fields, by spring. Price, \$35.00 per acre. Terms, cash. Road on three sides of this farm. Address A. M. Pettis, R. D. No. 1, Cranesville, Pa.

No. 114.—Farm of 120 acres, located in Waterford Township; one and one-half miles from Waterford postoffice, R. D. No. 1; Waterford is on line of Pennsylvania Railroad; thirty rods from school; one and one-half miles from church and creamery. Sandy loam soil. 25 acres in meadow; 15 acres in timber, maple, beech and ash. Nearly all tillable. Two orchards. Adapted to hay, oats, corn, rye, and vegetables. Wire fences. Main house, 26x50 feet; tenant house, 16x25 feet. Two barns. House is watered by well; barn and fields, by springs. Price, \$4,500.00. Terms, to suit purchaser. I am an old man and unable to manage this farm. Come to see me. Address W. I. Port, Waterford, Pa.

No. 115.—Farm of 174 acres, located in Venango Township; two miles from Loysville postoffice, R. D. No. 3; ten miles from railway station at North East, on line of L. S. & M. S. Railroad; one mile from school; two miles from Methodist church; two miles from creamery and milk station; three miles from condensery. Good roads. Surface is rolling. Gravel and loam soil. 40 acres in meadow; 15 acres in timber, beech, maple, hemlock, pine, etc. 90 acres tillable. Apple, pear and peach orchard. Adapted to corn, wheat, oats, buckwheat, dairying, etc. Barbed wire and rail fences. Sixteen-room house, in good condition. Two barns, 45x60 and 28x44 feet, respectively, good condition. House is watered by wells and cistern; barns by well and spring; fields, by springs and small stream. Price, \$5,000.00. Terms, \$2,000.00 cash and balance on mortgage. Good dairy farm. If purchaser desires, will sell stock and farm implements. Telephone and rural delivery. Old age and poor health are my reasons for desiring to sell. Address M. W. Blakely, Wattsburg, Pa.

No. 116.—Farm of 100 acres, located in Greene Township; three and one-half miles from Wesleyville postoffice, R. D. No. 1; Wesleyville is on the line of the Nickel Plate Railroad; one mile from school; one and one-half miles from Catholic and Presbyterian churches; four and one-half miles from creamery. Good roads. Surface is level. Loam soil. Twenty acres in meadow; five acres in timber, second growth maple. 75 acres tillable. Orchard consisting of apple, pear, peaches, etc. Adapted to gardening and dairying. Good barbed wire fences. Good 10-room house. Barn, 38x48 feet; another barn, 30x40 feet. Large chicken coop, corn crib and hog pen. Buildings are watered by well; fields are watered by spring. Price, \$6,500.00. Terms, cash and mortgage. This farm is in a high state of cultivation. Fine view of Lake Erie. Address A. H. Knoll, 314 W. 10th street, Erie, Pa.

No. 117.—Farm of 155 acres, located in Harbor Creek Township; three and one-half miles from Wesleyville, on line of Nickel Plate and P. & E. Railroads; one-half mile from school; two miles from Presbyterian church; three and one-half miles from milk station. Surface is rolling. Gravel and loam soil. 30 acres in meadow; 10 acres in timber, beech, maple and hemlock; 125 acres tillable. 175 peach, some cherry, apple, pear and plum trees. Adapted to general farm crops. Woven-wire fences, in good condition. 9-room house, good condition. Barn, 40x60 feet, in good condition. Chicken coop and hog pen. House and barn are watered by wells; fields, by springs and brook. Price, \$10,000.00. Terms, part cash and balance on mortgage. This farm is very productive and near the city of Erie. Good markets. Good gas well. Address A. H. Knoll, 314 W. 10th street, Erie, Pa.

No. 118.—Farm of 49 acres, located in Summit Township; three miles from Erie, R. D. No. 5; three miles from milk station and condensing plant. Good solid state road. Surface is rolling. Clay loam soil. About 40 acres are tillable. Apple, peach and plum orchard. Adapted to corn, oats, wheat, etc. Two story, 9-room house, in fair condition. Barn, 45x52 feet with basement and silo. Wagon shed, milk house and new chicken coop. House is watered by well and barn by cistern. Price, \$4,500.00. Terms, one-half cash and balance on time. Good market for everything grown. Address E. A. Rosenstihl, R. D., Erie Pa.

No. 119.—Farm of 421 acres, situated in Conneaut Township; one and one-half miles from Pennside postoffice, on line of Bessemer and Erie & Pittsburgh Railroads; one and one-half miles from school and church. Good roads. Surface is rolling. Soil is brown clay loam. 200 acres in timber, maple, hemlock, beech, chestnut, etc. 100 acres tillable. Adapted to hay, potatoes, cucumbers, etc. No fences or

buildings. Price, \$25.00 per acre. Terms, to suit purchaser. Address Mrs. Carrie T. Watson, Erie, Pa.

No. 120.—Farm of 67 acres, located in Franklin Township; five miles from Platea, on line of P. B. & L. E. Railroads; one-half mile from school; one-half mile from Methodist and Lutheran churches; one-half mile from creamery, cheese factory, milk station and condensery. Good roads. Surface is mostly level. Clay loam soil. 25 acres in meadow; 20 acres in timber; 45 acres tillable. Orchard. Adapted to corn, oats, hay, rye, potatoes, etc. Wire and rail fences, in fairly good condition. Eight-room house, fairly good. Two barns, cow shed, hog pen and chicken coop. House and barns are watered by good well; fields, by brook. Price, \$3,000.00. Terms, \$1,000.00 cash and balance on mortgage. This farm is rented and lease does not run until April 1, 1917. Owner, Mrs. J. Wright. Address E. S. Wright, Agent, 255 Harbor street, Conneaut, Ohio.

No. 121.—Farm of 203 acres, situated in North East Township; three and one-half miles from North East postoffice, R. D. No. 3; railway station at North East, on line of N. Y. C. & Nickel Plate Railroads; three-fourths mile from school; two miles from church; four miles to cheese factory. Turnpike and state roads. Surface is level. Clay loam soil. 90 acres in meadow; 12 acres in timber, second growth hardwood; 175 acres tillable. 200 apple and some pear and some crab apple trees. Adapted to oats, corn, wheat, rye, potatoes and grapes. Wire fences. Ten-room house, frame, nearly new. Barn, 56x78 feet with L, 25x30 feet. Cow and horse stable, cemented floors. House and barn are watered by well; fields, by running water. Price, \$8,500.00. Terms, cash. This is the best money-making farm in Erie County. Address S. C. Henry, R. D. No. 3, North East, Pa.

No. 122.—Farm of 91½ acres, situated in Greenfield Township; nine miles from North East postoffice, R. D. No. 6; five miles from railway station at Moorheads, on line of N. Y. C. & Nickel Plate Railroads; one-half mile from school; one and one-half miles from Baptist church; four miles from creamery; five miles from cheese factory. Roads are hilly. Erie, the county seat, is twelve miles away and has a population of 70,000. Surface is level. Soil is muck and loam. 20 acres in meadow; 15 acres in timber, hardwood; whole farm is tillable, if cleared. Apple, plum, pear and peach orchard. Adapted to grass, corn, potatoes, oats and small fruits. Woven and barbed wire fences, in good condition. Nine-room house, good condition. One bank barn and one surface barn with lean-to. House and barn are watered by wells; fields, by spring run. Price, \$4,000.00. Terms, one-fourth cash and balance on mortgage. This farm is six miles from Lake Erie and on the edge of the Chautauqua and Erie grape belt. Address Alfred H. Murphy, North East, Pa.

No. 123.—Farm of 60 acres, located in Springfield Township; one and one-half miles from East Springfield postoffice; one mile from Summerville, on line of Bessemer Railroad; one-fourth mile from school; two miles from Presbyterian, Christian and Methodist churches; two miles from creamery; one mile from condensing plant. Good roads. Surface is rolling. Muck and clay soil. 20 acres in meadow; three acres in sugar bush; 57 acres tillable. 1,000 raspberries, 25 peach trees, 25 apple trees, one-fourth acre strawberries. Adapted to general farm crops and vegetables. Rail and wire fences. Six-room house and pantry. Barn, 40x80 feet, granary, corn crib and wood shed. House and barn are watered by pump; fields by spring. Price, \$2,700.00. Terms, cash. This farm is mostly new just cleared. This farm particularly adapted to vegetables. Address Mrs. O. E. Stoker, East Springfield, Pa.

No. 124.—Farm of 250 acres, situated in Greenfield Township; five miles from North East postoffice, R. D. No. 6; North East is on line of N. Y. C. & Nickel Plate Railroads; one-half mile from school; two miles from creamery, cheese factory, milk station and condensing plant. Surface is rolling. Altitude is about 400 feet above Lake Erie. Loam, clay subsoil. About 50 acres in meadow; 50 acres in timber, second growth beech, maple, cherry and butternut. About 100 acres tillable and balance is good level grazing land. 125 apple and 150 cherry trees. Adapted to corn, grass and dairying. The fences are mostly wire and are in fair condition. Large old-fashioned house, 20x60 feet, good condition. Bank barn, 40x60 feet, good condition. Buildings are watered by wells and with gasoline engine. Price, \$8,000.00. Terms, \$1,500.00 cash and balance on time. This farm is in good cultivation. Stock has always been fed on farm. It is offered at a bargain. Owner has other business. Address T. R. Prendergast, Box 116, North East, Pa.

No. 125.—Farm of 112 acres, situated in Wayne Township; seven miles from Corry, R. D. No. 5; Corry is on line of Philadelphia and Erie Railroad; one mile from school; two miles from church; four miles from creamery. Roads are good except some hills. Surface is rolling. Gravel soil. 20 acres in meadow; 40 acres tillable. Apple, cherry, pear, plum and peach orchard. Adapted to corn, potatoes, oats, grass and livestock. Rail and wire fences. Large house, painted, fair condition. One barn, 30x60 feet, and one, 24x30 feet. House and barn are watered by well; fields, by spring in pasture. Price, \$3,500.00. Terms, \$2,000.00 cash and balance on time. Address J. W. Moore, R. D. No. 5, Corry, Pa.

No. 126.—Farm of 210 acres, located in Wayne Township; five and one-half miles from Corry, R. D. No. 5; Corry is on line of P. & E. Railroad; near school and church; five and one-half miles to creamery

and cheese factory. Good roads with a little grade. Surface is hilly enough for drainage. Altitude, 1,600 feet. Sandy loam soil. 35 acres in meadow; 60 acres in timber, cherry and maple; 100 acres tillable. 100 apple trees with some pear and cherry. Adapted to wheat, oats, corn and buckwheat. Barbed-wire fence. Two-story, eight room house with attic and cellar, in fair condition. Horse barn is 30x40 feet, and cow barn, 40x60 feet. House and barn are watered by wells; fields, by springs. Price, \$7,000.00. Terms, one-half cash and balance in five years. This price will include livestock, implements, hay and grain. Address George Blynt, R. D. No. 5, Corry, Pa.

No. 127.—Farm of 100 acres, located in North East Township; two miles from North East postoffice, R. D. No. 5; North East is on line of N. Y. C. Railroad; one-half mile from school; two miles from church, eight denominations; two miles from creamery and milk station. Good roads. Part of the surface is level and part rolling. This farm is three miles from Lake Erie. Loam and clay soil, good. Whole farm is tillable; 25 acres in meadow. 150 trees of all kinds of fruit. Adapted to general farm crops and fruit. Mostly wire fence and in good repair. Main house has nine rooms, bath room, in good condition; tenant house, seven rooms, good condition. Bank barn, 40x50 feet. All buildings on this farm are in good condition. Good gas well. This farm is in good state of cultivation. An adjoining farm has 100 acres of grapes and 25 acres of asparagus. Bell telephone connections. Price, \$16,000.00. Terms, \$3,000.00 cash and balance to suit purchaser at five per cent. Address M. A. Arnold, North East, Pa.

No. 128.—Farm of 65 acres, located in LeBoeuf Township; one mile from Mill Village postoffice; one and one-fourth miles from railway station at Mill Village, on line of Erie Railroad; one mile from school and creamery; one mile from Methodist and Presbyterian churches. Good dirt roads. Meadows nearly all level; pasture rolling. Good loam soil. 24 acres tillable. 40 apple trees and some plum, pear and prune trees. Adapted to hay, corn, oats and potatoes. Wire fences, fair condition. Good frame house, 18x30 feet, with L. Barn, 32x44 feet, with cement basement, good condition; another barn, 20x30 feet, good; hog house. House is watered by good well; barn and fields, by brook. Price, \$3,400.00. Terms, one-third cash and balance on mortgage. Old age is my reason for desiring to sell. Address Mrs. M. M. Brainard, Mill Village, Pa.

No. 129.—Farm of 125 acres, located in Springfield Township; two miles from West Springfield postoffice; one mile from railway station at West Springfield, on line of Bessemer and Lake Erie Railroad; two miles from school; two miles from Methodist and Baptist

churches. Good roads. Surface is rolling enough to drain well. Gravel, loam and clay soil. 80 acres tillable. 40 apple trees. Adapted to corn, potatoes, vegetables and fruit. Barbed wire, woven-wire and rail fences, in good condition. Nine-room house, fair condition. Large barn, 45x60 feet. Shed, tool house, hen house, corn crib and hog pen. House is watered by well and cistern; barn, by well; fields, by spring. Price, \$60.00 per acre. Terms, one-third cash and balance in easy payments. Centralized school. Telephone connections. Rural mail delivery. Address W. L. Abbey, West Springfield, Pa.

No. 130.—Farm of 62 acres, situated in Washington Township; one and one-fourth miles from Edinboro, R. D. No. 1; six miles from Cambridge Springs, on line of Erie Railroad; one mile from school; one and one-fourth miles from Methodist, Presbyterian, Adventist and Baptist churches; one-half mile from creamery; one-fourth mile from milk station. Near state highway. Surface is level. Rich gravel loam soil. Nineteen acres in meadow; one acre in timber, beech, maple and ash. Forty-eight acres tillable. Small apple orchard. Adapted to wheat, corn, oats and hay. Wire and rail fences, in good condition. Eleven-room house, in fair condition. Extra large barn, cost \$3,500.00 to build. Hog house and shop. House and barn are watered by wells; fields, by running water in pasture. Price, \$6,000.00. Terms, two-thirds cash and balance on time. Silo in barn. Address N. L. Batchelor, R. D. No. 1, Edinboro, Pa.

No. 131.—Farm of 100 acres, situated in Greene Township; four miles from Waterford postoffice, R. D. No. 5; one-half mile from railway station at Sampsons, on line of P. & E. Railroad; two miles from school; four miles from Presbyterian, Methodist and United Presbyterian churches; one-half mile from cheese factory; one-fourth mile from milk station. Good state roads. About one-half of this farm is level and the other half is rolling. Gravel and muck soil. Thirty acres in meadow; thirty acres in timber, soft maple, elm and black ash; fifty acres tillable. Adapted to hay, oats, wheat and corn. Very good wire fences. Good house, 16x24 feet, with addition. Wood house. Bank barn, cemented floors, silo, milk house, etc. House and barn are watered by wells; fields, by running water in pasture. Price, \$6,000.00. Terms, one-half cash and balance on liberal terms. This is a good dairy farm and is well watered. Well adapted to the growing of onions and celery. Address Herbert C. Hayes, R. D. No. 5, Erie, Pa.

No. 132.—Farm of 62 acres, located in Greene Township; seven miles from Erie, R. D. No. 7; four miles from railway station at Belle Valley, on line of Pennsylvania Railroad; three-fourths mile to school; two and one-half miles to Presbyterian and Lutheran churches; six miles to creamery. Good roads with some hills. Sur-

face is level. Good clay loam soil. 14 acres in meadow; three acres in timber, beech and maple; 40 acres tillable. 40 apple and some pear, peach, prune, plum and cherry trees. Well adapted to oats, potatoes, clover, wheat and cabbage. Wire fences. Good nine-room house with cemented cellar. Good barn, 40 feet square, with covered barn yard. Wagon shed, hog pen, hen house, etc. Well in house. Pump at barn. Fields are watered by springs. Price, \$5,000.00. Terms, two-thirds cash and balance on long time. There are four kinds of berries, currants and grapes. Good neighborhood. Good pasture. Sugar bush. Address F. L. Fails, R. D. No. 7, Erie Pa.

No. 133.—Farm of 234 acres, located in Summit Township; five miles from Erie, R. D. No. 5; three-fourths mile from railway station at Langdon, on line of Philadelphia & Erie Railroad; three-fourths mile from school and church; three miles from creamery. Good roads. Erie has a population of 80,000. Gravel and loam soil. 28 acres in meadow; 35 acres in timber, beech, maple and cherry; 100 acres tillable. Orchard. Adapted to wheat, oats, hay, corn and rye. Good wire fences. House, 21x36 feet. Barn, 45x76 feet, cemented floors. House is watered by spring and well; barn, by running spring water; fields, by running water in pasture. Price, \$65.00 per acre. Terms, part cash and balance to suit purchaser. Tool house, chicken house, pig pen, ice house, etc. Sheep barn. Address J. H. Shattuck, 1817 Sassafras street, Erie, Pa.

No. 134.—Farm of 300 acres, situated in Greene Township; five miles from Waterford postoffice, R. D. No. 1; one and one-half miles from railway station at Sampson, on line of Philadelphia & Erie Railroad; school building on farm; two and one-half miles to church; three miles from cheese factory. Good roads. Surface is level. Soil is gravel and sandy loam. About 65 acres in meadow; 60 acres in timber, over 600 sugar maple trees. 120 acres tillable. Apple orchard. Adapted to general grain crops. Good fences. Large house, 17 rooms, first class condition. Barn, 76x91 feet. Hog house, chicken coop, garage, etc. This farm is watered by springs and creek. Price, \$80.00 per acre. Terms, to suit purchaser. Farm is in good state of cultivation. More of this land can be placed under cultivation. Bath room. Silo. Address F. W. Coover, R. D. No. 1, Waterford, Pa.

Fayette County.

No. 135.—Farm of 206 acres, situated in Bullskin Township; four miles from railway station at Harmonville, on line of Baltimore & Ohio Railroad; one and one-half miles from school and church; five miles from creamery. Roads are fair. Surface is rolling. Limestone soil. Seventeen acres in meadow; 100 acres in timber. Fifty acres tillable. Fruit: 100 peach, 75 apple, 2,000 raspberries and blackberries. Adapted to general farm crops. Wire and rail fences.

Six-room house, in fair condition. Barn, 36x50 feet, fair condition. Water in house and piped to barn. Price, \$3,000.00. Terms, \$1,000.00 cash and balance to suit purchaser. Address A. L. Dick, Stauffer, Pa.

Forest County.

No. 136.—Farm of 20 acres, situated in Kingsley Township; one-fourth mile from Starr postoffice, star route; six miles from railway station at Tionesta, on line of Pennsylvania Railroad; one-eighth mile from school; one-third mile from church. Tionesta is the county seat. Good roads. Surface is level. Rich loam soil. 10 acres in meadow; five acres in timber, oak and chestnut. 10 acres tillable. Orchard. Adapted to wheat, corn, clover and trucking. Good wire fence around pasture. House 24x25 feet, kitchen, weather boarded and painted. Barn 24x46 feet. Wood shed, chicken coop, etc. House and barn are watered by well; fields, by springs. Price, \$900.00. Terms, one-half cash and balance on time. Address John Zuendel, Starr, Pa.

No. 137.—Farm of 100 acres, located in Kingsley Township; one mile from Kellettsville postoffice and railway station, on line of S. & T. Railroad; one mile from school. Good level state road. One-half of this farm is level and the other half is rolling and hilly. Soil is loam and very fertile. Fifteen acres in meadow; thirty acres in timber, principally oak and hemlock; fifty acres tillable. Forty large apple trees. Adapted to corn, potatoes, wheat, oats and hay. Barbed wire fences. House 24x36 feet, two story, needs some repairs. Barn, 40x46 feet, concrete basement. Tool house, etc. Buildings and farm are watered by springs. Price, \$2,500.00. Terms, one-half cash and the balance on time. Will sell livestock, implements and crops cheap to quick buyer. Address L. Jensen, Kellettsville, Pa.

Fulton County.

No. 138.—Farm of 726 acres, situated in Licking Creek Township; one-half mile from Saluvia postoffice; seventeen miles from railway station at Fort Loudon; one-half mile from school; one and one-half miles from Presbyterian and Methodist churches. This farm is on the Lincoln Highway which is a splendid road. McConnellsburg, the county seat, is nine miles distant. Surface is rolling. Altitude, about 1,300 feet. Red shale soil. About 400 acres in young timber. 200 acres tillable. Adapted to wheat, corn, buckwheat, potatoes, etc. Wire and rail fences. Large stone house, in fair condition. Stable and other outbuildings. Buildings are watered by well; fields, by small streams. Price, \$5,500.00. Terms, \$3,000.00 cash and balance

on time. It is desired to sell this farm in order to close an estate. This is a proposition worth looking into. Owner, John J. McDonald Estate. Address John P. Sipes, Attorney, McConnellsburg, Pa.

No. 139.—Farm of 100 acres, located in Licking Creek Township; one mile from Saluvia postoffice; one mile from school and near Methodist and Presbyterian churches; eight miles from creamery. This place is known as Green Hill and is on the Lincoln Highway, eight miles from McConnellsburg. Surface is smooth, part rolling and part nearly level. Altitude, about 1,000 feet. Shale and clay soil. About 35 acres in meadow; 18 acres in second growth pine; whole tract is tillable if cleared. Some pear and chestnut trees. Adapted to wheat, rye, oats, corn, potatoes, etc. Wire, rail and board fences, in good condition. No buildings on this tract. Fine never-failing springs. Price, \$3,000.00. Terms, one-half cash and balance to suit purchaser. This tract of land may be divided into three or four small farms. Lumber for buildings will be included at price mentioned. Good building sites. The owner will sell his entire farm including hotel and about forty acres of good timber for \$6,000.00. This is a very desirable location and a comfortable home. Address J. A. Stewart, Saluvia, Pa.

No. 140.—Farm of 313 acres, situated in Todd Township; three miles from Knobsville postoffice; six miles from railway station at Richmond Furnace, on line of South Penn Railroad; two miles from school; three miles from Methodist church; nine miles from creamery. Roads are somewhat rough at present but are level and will be put in good condition. McConnellsburg is nine miles distant. Surface is rolling. Altitude, about 1,200 feet. Twenty-five acres in meadow; 240 acres in timber, chestnut, oak, pine, hickory, etc. Seventy acres tillable. Abundance of all kinds of fruit. Adapted to corn, potatoes and wheat. House, 18x28 feet, not in good condition. Bank barn, 28x40 feet, nearly new. Hen house, wood house and other out-buildings. Buildings and fields are watered by springs and small mountain streams. Price, \$800.00. Terms, cash. Telephone line from McConnellsburg to Burnt Cabins passes this farm. Address George W. Wagoner, Knobsville, Pa.

Huntingdon County.

No. 141.—Farm of 50 acres, located in Henderson Township; six miles from Huntingdon, R. D. No. 3; three and one-half miles from railway station at Mill Creek, on line of Pennsylvania Railroad; one-half mile from school and church. Roads are fair—some state highway. Huntingdon, the county seat, has a population of 6,000. Surface is hilly and rolling. Mostly red shale soil. Twenty acres in large timber; thirty acres tillable. Young orchard of 200 trees,

fifty-five bearing. Adapted to general farm crops. Old log house. Barn in fair condition; hog house and chicken house. This property is watered by springs. Price, \$600.00. Terms, cash. This is a healthy location. Address Mrs. Hattie Jones, 316 Seventeenth avenue, Homestead, Pa.

No. 142.—Farm of 215 acres, located in Henderson Township; six miles from Huntingdon, R. D. No. 3; three and one-half miles from railway station at Mill creek, on line of Pennsylvania Railroad; one-half mile from school and church. Roads are in fair condition. Surface is generally rolling. Sandy and red shale soil. 100 acres in timber. 75 acres tillable. Well adapted to general farm crops and small fruits. Plain wire and woven wire fences. Five-room house, 18x28 feet, in fair condition. Barn, 33x44 feet, fair condition. Hog house and chicken house. This farm is watered by springs. Price, \$2,000.00. Terms, one-half cash and balance to suit purchaser. Very healthy location. No early or late frosts. Daily mail at door. Address Mrs. Hattie Jones, 316 Seventeenth avenue, Homestead, Pa.

No. 143.—Farm of 200 acres, situated in Shirley Township; one-half mile from Wistie postoffice, eight miles from railway station at Shirleysburg, on line of East Broad Top Railroad; one mile from school; two and one-half miles from Dunkard church. Surface is rolling. Slate and sandy soil. 15 acres in meadow; 100 acres in timber, thrifty young oak, chestnut and locust. About 85 acres tillable. Adapted to corn, wheat, oats, rye, buckwheat and potatoes. Barbed wire fences around pasture. House, 35x50 feet, good. Some outbuildings. House and barn are watered by good spring and brook. Price, \$1,500.00. Terms, one-half cash and balance in one year. This is a splendid pasture farm. Very healthy location. Address L. G. Parson, Wistie, Pa.

No. 144.—Farm of 160 acres, situated in Cromwell Township; two and one-half miles from Orbisonia; one and one-half miles from railway station at Blacklog, on line of E. B. T. Railroad; one and one-half miles from school; two and one-half miles from Methodist, United Brethren and Catholic churches. Good roads. Part of this farm is level and part hilly. Limestone and slate soil. Ten acres in grass; 60 acres in good oak and hickory timber. 100 acres tillable. 25 apple, 25 peach, 20 plum and 15 cherry trees. Adapted to wheat, corn, oats and potatoes. Good wire fences. Stone house, seven rooms, good. Barn, 40x70 feet, fair condition. Wood house, hog pen, chicken house and ice house. House is watered by spring; running water at barn; fields, by spring. Price, \$2,000.00. Terms, one-half cash and balance on purchase money judgment. 50,000 feet of lumber can be cut. Lots of locust for posts. 150 cords of extract wood. Address Mrs. Nathan Bernhardt, Orbisonia, Pa.

No. 145.—Farm of 145 acres, located in Shirley Township; one and one-half miles from Shirleysburg postoffice, R. D. No. 1; railway station at Shirleysburg, on line of E. B. T. Railroad; near school; one-half mile from German Reformed church and one and one-half miles from Dunkard and Methodist churches. Good roads and almost level. This farm has a gradual slope to the east. 20 acres in meadow; 55 acres in timber, mostly white and yellow pine. Ninety acres tillable. Orchard of different kinds of fruit. Adapted to general farm crops. Barbed wire and post and rail fences. Eight-room house, nearly new, water and bath in house. Good barn, 36x60 feet. Outbuildings of all kinds. House is watered by spring and well; barn, by stream; fields, by springs. Price, \$4,000.00. Terms, \$2,000.00 cash and balance to suit purchaser. There is timber enough on this farm to pay for it. Telephone line. Rural mail delivery. This is a lovely home and a good community. Old age and no family are my reasons for desiring to sell. Address O. W. Colgate, R. D., Mt. Union, Pa.

No. 146.—Farm of 137 acres, situated in Logan Township; two and one-half miles from Petersburg postoffice, R. D. No. 1; Petersburg is on line of Pennsylvania Railroad; one-fourth mile from school; two and one-half miles from church and creamery. Surface is somewhat rolling. Ten acres in meadow. One-half of this farm is in chestnut, oak and pine timber and the other half is tillable. 100 peach, 50 apple, and some cherry and plum trees. Adapted to general farm crops. House, 18x26 feet, fair condition. Good frame bank barn, 40x54 feet. Hog pen, chicken house and other outbuildings. Price, \$2,000.00. Terms, one-half cash and balance in payments. Water can be piped to house and barn. Address William Whitesel, Petersburg, Pa.

No. 147.—Farm of 200 acres, situated in Hopewell Township; two miles from postoffice, one mile from railway station at Cove, on line of H. & B. T. Railroad; one-half mile from school and church. Surface is rolling. 25 acres in meadow; 25 acres in good oak timber; 150 acres tillable. 50 choice apple and 500 bearing peach trees. Adapted to corn, wheat and rye. Wire fences. Houses, 20x30 feet, three story, ten rooms, fine condition. Bank barn, 40x80 feet, in fine condition. House is watered by well and spring, barn, by running water; plenty of water in the fields. Price, \$3,000.00. Terms, \$1,000.00 cash and balance to suit purchaser. The barn and house are worth \$2,500.00. Address Oliver Weaver, Shy, Beaver, Pa.

No. 148.—Farm of 165 acres, located in Union Township; five miles from Mapleton Depot postoffice, R. D. No. 1; Mapleton Depot is on line of Pennsylvania Railroad; three-fourths mile from school; three miles from Catholic and Episcopal churches. Good level dirt roads.

Part of the surface is level and part hilly—all smooth. Good red shale soil. 10 acres in meadow; 85 acres in timber, chestnut, pine, hickory, etc. 80 acres tillable. 100 apple, 30 sweet cherry and some plum and pear trees. Adapted to corn, oats, wheat, potatoes, hay and vegetables. Wire fences, in good condition. Eight-room house, 28x32 feet, in good condition. Basement barn, 45x58 feet, in good condition. Wagon shed and other necessary outbuildings. House is watered by good spring; barn, by running water; good water in each field. Price, \$2,250.00. Terms, \$500.00 cash and balance in four equal payments. This is a good location and is a good stock and truck farm. Address Anderson B. Dell, Mapleton Depot, Pa.

No. 149.—Farm of 115 acres, situated in Juniata Township; four miles from Huntingdon postoffice, R. D. No. 1; four miles from Huntingdon, on line of Pennsylvania Railroad; one and one-half miles from school; one mile from church, Lutheran and Methodist. Good roads. Nearest large town is Huntingdon, population 7,000. Reached by highway. Surface rolling. The soil is slate and red shale. Six acres in meadow; fifty acres in timber. Kind and quality, good pine and white oak. Sixty-five acres tillable. Fruit: 100 apples, 20 cherries, some grapes, plums and pears. Best adapted to corn. Wire fences, in fairly good condition. House is 24x38 feet, fairly good condition. Bank barn 40x60 feet, new galvanized roof, good condition. House, barn and fields watered by springs. Price, \$1,400.00. Well adapted to fruit. Good locality for hunting and fishing. Owners, Elizabeth Thompson's Estate. Address T. W. Speck, 1325 Warm Spring avenue, Huntingdon, Pa.

No. 150.—Farm of 30 acres, situated in Union Township; one-half mile from Mapleton Depot postoffice and railway station, on line of Pennsylvania Railroad; one-half mile from school; one-half mile from church, Presbyterian, United Brethren and Methodist. Township roads, in good condition. Farming land is level. Good soil for trucking. Small portion of land in good timber, principally pine. Over 25 acres tillable. Adapted to vegetables, truck, poultry, etc. Fenced, but in poor condition. Two frame houses, one with four rooms and the other with three rooms. Big barn, in good condition. House is watered by well; barn and fields by creek. Price, \$2,600.00. Terms, cash. There is an ice pond running through this farm which would be a good producer for purchaser. Narrow gauge railroad runs through the timber land. Address Priscilla E. Miller, Cor. Seventh & Spring Garden streets, Philadelphia, Pa.

No. 151.—Farm of 142 acres, situated in Union Township, one mile from Mapleton Depot postoffice and railway station, on line of Pennsylvania Railroad; one and one-half miles from United Brethren, Presbyterian and Methodist Episcopal churches. Some of the roads

as well as the surface of the farm are level and some hilly. Soil is generally good. Seventy-five acres in oak and pine timber and about seventy-five acres tillable. Apple orchard. Adapted to the production of wheat, rye, hay and potatoes. Fences are in fair condition. Five-room house, in fair condition. Barn, fair condition. House and barn are watered by pump and creek. Price, \$3,500.00. Terms, cash. The road divides this farm from the thirty-acre farm described above. Address Priscilla E. Miller, Seventh & Spring Garden streets, Philadelphia Pa.

Indiana County.

No. 152.—Farm of 90 acres, situated in Conemaugh Township; three miles from Livermore postoffice, R. D. No. 2; two and one-fourth miles from railway station at Clarksburg, on line of B. R. & P. Railroad; one-fourth mile from school; one-half mile from church, United Presbyterian; three miles to milk station. Good roads. Blairsville is eight miles away and has a population of 6,000; may be reached by rail and highway. Surface is rolling. Clay soil. Ten acres in meadow; eight acres in timber, locust and small timber. Seventy acres tillable. Fruit: apple, prunes, cherry, plums and grapes. Adapted to general farming. Fences are reasonably good. Frame cottage house, six rooms and porch. Large bank barn, in good condition. Necessary outbuildings. House and barn are watered by splendid spring; fields, by running water. Price, \$2,500.00. Terms, one-half cash and balance on time. This is a good neighborhood. Address Daniel Kennedy, Box 505, Saltsburg, Pa.

No. 153.—Farm of 145 acres, located in Conemaugh Township; two miles from Clarksburg postoffice and railway station, on line of Buffalo, Rochester & Pittsburgh Railroad; one-fourth mile from school; two miles from Presbyterian church; four miles from milk station. Macadam roads. Surface is rolling and level. Altitude is 925 feet. Sandy loam soil. 40 acres in meadow; 10 acres in timber, second growth hardwood. 125 acres tillable. 40 apple trees and twelve grape vines. Adapted to hay, corn, oats, wheat and potatoes. 600 rods of wire fence with locust posts. House, 24x30 feet, seven rooms and hall, slate roof, built fifteen years ago. Barn, 32x40 feet. Carriage house, corn crib and poultry house. House and barn are watered by wells; fields, by running stream. Price, \$7,250.00. This would make an ideal dairy farm. Good markets for all produce. Address J. I. and W. M. Nowry, Saltsburg, Pa.

No. 154.—Farm of 206 acres, located in Center Township; six miles from Indiana, R. D. No. 5; four miles from railway station at Homer City, on line of Pennsylvania Railroad; three-fourths mile from school; one mile from church, Presbyterian. Good gravel and

macadam roads. Surface is largely rolling. Altitude is about 1,200 feet. Gravel and clay soil. 50 acres in meadow; 25 acres in timber, oak, hickory and chestnut. The balance of this farm is tillable. Fruit: apple, pear, peach, prunes and grapes. Adapted to corn, wheat, rye, oats, clover and timothy. Wire, rail and some board fences, good. Seven-room house with basement. Bank barn, 60x70 feet, in good condition. Wagon shed and chicken house. Water is piped to house and barn. Fields are watered by springs. Price, \$5,500.00. Terms, \$3,000.00 cash and balance on time. This farm is a good producer and is in a good neighborhood. Owner, J. M. Winsheimer. Address Frank Winsheimer, R. D. No. 5, Indiana, Pa.

No. 155.—Farm of 168 acres, located in Conemaugh Township; one-half mile from Clarksburg; three-fourths mile from railway station, on line of B. R. & P. Railroad; one-half mile from school; one-half mile from Presbyterian church. Macadam roads. Rich sandy loam bottom land. 30 acres in meadow; 68 acres in timber, mostly oak; 100 acres tillable. Fruit: 80 peach, 50 apple and 12 cherry trees. Adapted to corn, wheat, oats and potatoes. Woven wire fences, in good condition. Large house, eight rooms, slate roof, good condition. Barn, 50x60 feet, double floor, good as new. Wagon shed, pig pen and coal house. House and barn are watered by pump; water in all fields. Price, \$45.00 per acre. Terms, to suit purchaser. Telephone and rural mail services. This is a good farm and a pleasant home. Address J. C. Rose, R. D. No. 1, Saltsburg, Pa.

No. 156.—Farm of 100 acres, situated in Young Township; three-fourths mile from West Lebanon postoffice and railway station, on line of B. R. & P. Railroad; three-fourths mile from school; three-fourths mile from church, Presbyterian, Methodist and United Presbyterian; one mile from milk station. Good state road through farm. Surface is hilly but can all be worked. Loam soil. 25 acres in meadow; three acres in white oak timber; 90 acres tillable. Plenty of fruit. Adapted to corn, oats, wheat, rye, buckwheat, etc. Pasture is fenced. Good large house, six rooms. New four-room tenant house. Good barn, 54x60 feet. Garage and other outbuildings. Water is piped to house and barn. Fields are watered by springs and stream. Price, \$8,000.00. Terms, one-third cash and balance in payments. Underlaid with coal. Mine can be opened on farm. Good markets. Address John Fulton, R. D. No. 1, Parkwood, Pa.

No. 157.—Farm of 138 acres situated in East Wheatfield Township; three miles from New Florence postoffice, R. D. No. 2; New Florence is on the main line of the Pennsylvania Railroad; near school; three miles from church, Catholic and Protestant; two and one-half miles from milk station. Good roads. Johnstown is nine miles away

and has a population of 80,000. Surface is hilly, rolling and level. Altitude, 1,150 feet. Soil is part loam and part shale. About 20 acres in meadow; 40 acres in timber, principally good oak. 98 acres tillable. Fruit: apple, pear, peach, plum and cherry. Well adapted to wheat, corn, oats and potatoes. Rail fences, not in very good condition. Seven-room house, pantry, hall and porches, fair condition. Barn, 60x80 feet, granary, buggy shed, hog house and chicken house. House is watered by well; barn, by running stream; fields, by springs. Price, \$75.00 per acre. Terms, cash. There is a four-foot vein of coal underlying this farm. The coal right may be sold at \$35.00 per acre. Fire clay. Owners, William Bennett Heirs. Address George F. Smith, 920 Edgehill Drive, Johnstown, Pa.

No. 158.—Farm of 165 acres, located in Conemaugh Township; near Nowrytown postoffice; one mile from railway station at Edri, on line of West Pennsylvania Railroad; one-fourth mile from school; one-fourth mile from church, Methodist, Presbyterian, Lutheran, Baptist and Catholic; one mile from milk station. Good roads. Surface is rolling and is not rough or stony. Altitude is 1,300 feet. 40 acres in meadow; 50 acres in timber, white oak, pin oak, locust and chestnut. Whole farm is tillable except the fifty acres which is in virgin timber. Fruit: 200 trees, apple, pear, plum, peaches, quince and apricot. Adapted to wheat, corn, oats, rye, buckwheat, potatoes and vegetables. Mostly wire fences with locust posts and will last for 75 years. House, 38x40 feet, eight rooms, large hall and cellar. Frame barn, 60x85 feet, just roofed the past summer. House is watered by well and cistern; barn, by spring and well. Price, \$50.00 per acre. Terms, one-third cash and balance secured by mortgage. Advanced age is my reason for desiring to sell. Address William H. Kennedy, R. D. No. 2, Saltsburg, Pa.

No. 159.—Farm of 135 acres, situated in Conemaugh Township; one mile from Saltsburg postoffice, R. D. No. 2; Saltsburg is on line of Pennsylvania Railroad; one-fourth mile from school and church; one mile from ice cream factory. Macadam roads. 44 acres in meadow; 5 acres in young timber. 130 acres tillable. 300 peach, 200 apple, 50 cherry, some plum and prune trees. Adapted to general farm crops. Woven wire fences, fair condition. House, 16x32 feet, six rooms, slate roof, good. Barn 40x70 feet. Wagon shed, corn crib and milk house. House is watered by well; barn, by well and running water; fields, by runs and spring. Price, \$60.00 per acre. Terms, one-half cash and balance to suit purchaser. I have 20 head of cows and a standing order for 25 gallons of milk every day. Address James M. Keeley, Saltsburg, Pa.

No. 160.—Farm of 200 acres, situated in Armstrong Township; three miles from Shelocta postoffice, R. D. No. 7; one-half mile from railway station at Thomas, on line of B. R. & P. Railroad; school

on farm; two miles from church, Presbyterian, United Presbyterian and Methodist. Good roads mostly hard clay and macadam. Surface is part rolling and part level. Altitude, 1,300 feet. Soil is alluvial and clay. 30 acres in meadow; 10 acres in timber, oak, chestnut and poplar. Practically whole farm is tillable if cleared. About 100 apple trees and some plum and prune trees. Adapted to cereal crops and potatoes. Good wire and rail fences. Brick house, 39x40 feet, two and one-half story, nine rooms and finished attic. Barn, 50x60 feet, comparatively new, steel roof. Chicken house, coal house and smoke house. House is watered by spring and well; never-failing running water in barn; water in all the fields. Price, \$40.00 per acre. Terms, to suit purchaser. This farm has always been well cared for and well fertilized. Address J. G. Fleming, 716 Church street, Indiana, Pa.

No. 161.—Farm of 167 acres, situated in Burrell Township; two miles from Blairsville, R. D. No. 1; three-fourths mile from railway station at Smith, on line of Pennsylvania Railroad; one-half mile from school and church; three-fourths mile from condensing plant. State highway. Surface is nearly all level. Limestone soil. 60 acres in meadow; two acres in oak timber. 160 acres tillable. Fruit: apple and plum. Adapted to hay, wheat, corn and oats. Woven wire and post and rail fences. House, 32x40 feet, new kitchen, thirteen rooms and bath. Tenant house with four rooms. Barn, 70x70 feet, slate roof, wagon shed, etc. Running water at house and barn. Fields are watered by three springs. Price, \$100.00 per acre. Terms, part cash and balance on time. This house has bath with hot and cold water. Twenty acres of coal land. Address Charles M. Sides, Indiana, Pa.

No. 162.—Farm of 94 acres, located in Rayne Township; one and one-half miles from Marion Center postoffice, R. D. No. 1; one and one half miles from railway station, on line of Buffalo, Rochester & Pittsburgh Railroad; one and one-half miles from school; one and one-half miles from church, Methodist and Presbyterian; two miles from creamery. Good level roads. Surface is rolling. Clay loam soil. Fifteen acres in meadow; eight acres in timber, oak and chestnut. Eighty acres tillable. Small apple and peace orchard. Adapted to oats, corn, wheat, rye and buckwheat. Rail fences, in fair condition. Good house, 32x32 feet. Barn, 45x60 feet. Good wagon shed and corn crib. Water is piped from spring to house. Barn and fields are watered by springs. Price, \$7,000.00. Terms, part cash and balance on mortgage. This farm is underlaid with vein of good quality coal. Address David & Charles Weamer, Indiana, Pa.

No. 163.—Farm of 156 acres, situated in Young Township; seven miles from Livermore postoffice, R. D. No. 2; two miles from railway

station at Clarksburg, on line of Buffalo, Rochester & Pittsburgh Railroad; near school; two miles from Presbyterian church. State highway. Surface is diversified from bottom land to hills. Principally clay soil. Twelve acres in meadow; 70 acres in timber, hardwood. Eighty acres tillable. Adapted to general farming. Board, wire and rail fences, not in good condition. Six-room house, fairly good. Bank barn, 50x60 feet. House and barn are watered by well; fields, by spring and stream. Price, \$3,000.00. Terms, \$1,000.00 cash and balance to suit purchaser. A good market at coal mine three miles distant. Telephone line. Coal and coal mining rights are reserved. Address John N. Arnold, R. D. No. 2, Saltsburg, Pa.

Jefferson County.

No. 164.—Farm of 45 acres, located in Polk Township; one-half mile from Munderf postoffice, star route; five miles from railway station at Allen, on line of Shawmut Railroad; one-half mile from school; one mile from Methodist church. Brookville, the county seat, is ten miles away, population 3,000. Surface is nearly level. Clay loam soil. Thirty acres in meadow. Whole farm is tillable. Orchard. Adapted to oats, hay, wheat and corn. Fences are fairly good. Nearly new 7-room house with cellar. Barn, 36x48 feet, fair condition. Wagon shed and other out-buildings. House is watered by spring; barn, by well; fields, by small stream. Price, \$2,000.00. Terms, to suit purchaser. Will include livestock, crops and machinery for \$3,000.00. Address N. W. Clark, Munderf, Pa.

No. 165.—Farm of 57½ acres, situated in Warsaw Township; two miles from Allens Mills postoffice, R. D. No. 1; Allens Mills is on line of Pittsburgh, Shawmut & Northern Railroad; one and one-fourth miles to school; one and one-half miles to church. Good hard dirt roads. Altitude, 1,350 feet. Forty acres in meadow; five acres in timber, chiefly chestnut. About 50 acres are tillable. Fruit: 44 apple, 43 pear, 20 cherry, 25 plum—all bearing. Adapted to general farm crops, fruit and vegetables. Wire and rail fences, in fair condition. Two-story frame house, 22x32 feet, pretty good house. Barn, 32x42 feet, good condition. Sheds, shop and other out-buildings. Spring at the door. Fields are watered by several springs. Price, \$2,800.00. Terms, \$1,000.00 cash and balance to suit purchaser. No leases or mineral reserves. Adjoining farm was leased last month for gas and oil. Address Charles M. Reynolds, R. D. No. 1, Allens Mills, Pa.

No. 166.—Farm of 170 acres, situated in Polk Township; five miles from Sigel postoffice, R. D.; ten miles from railway station at Brookville; one and one-half miles from school; one mile from church. Good wagon and auto roads. Surface is rolling. Soil is sandy. Ten

acres in meadow; 115 acres in timber, pine, hemlock, oak and chestnut. 45 acres tillable. 100 apple trees and fruit of other kinds. Adapted to wheat, oats, corn, buckwheat and potatoes. Fairly good rail fences. Five-room house. Barn, 28x30 feet. Outbuildings. Buildings and fields are watered by springs. Price, \$500.00. Terms, cash. This farm is well adapted to general farm crops and would make a good stock farm. Address Mrs. Annie Masters, Sigel, Pa.

Juniata County.

No. 167.—Farm of 48 acres, situated in Milford Township; one-fourth mile from Mifflin postoffice and railway station, on line of Pennsylvania Railroad; one-fourth mile from school and church; one-third mile from milk station; one mile from creamery. Fairly good roads. Surface is rolling. Shale and limestone soil. About five acres in timber. Forty acres are tillable. Fruit: apple, plum, pear and cherry orchard. Adapted to wheat, oats and corn. Wire fences, fairly good. Two-story frame house, 18x25 feet, fairly good. Bank barn, 35x52 feet, fairly good. New hog house. Water is piped to house and barn. Fields are watered by springs. Price, \$3,000.00. Terms, cash. This is a desirable place to live and is about one mile from Mifflintown, the county seat. Address H. H. Heikes, Mifflin, Pa.

No. 168.—Farm of 80 acres, located in Fayette Township; six miles from Mifflintown, the county seat, on line of Pennsylvania Railroad; near school; two miles from Methodist church; six miles from creamery. Nearly all state road. Surface is rolling and level. Gravel soil. Five acres in meadow; fifteen acres in timber, oak, chestnut and hickory. Sixty acres tillable. 25 apple, 17 peach, 25 plum, six pear and two quince trees. Adapted to general farm crops. Wire fences, in fair condition. Stone house, eight rooms, good new roof. Good large barn. New pig pen, wood house and chicken house. Buildings and fields are watered by running water. Price, \$2,800.00. Terms, cash. Most of the fruit trees are young. This is an ideal farm for livestock and poultry. Address Mrs. Blanche Keiter, R. D. No. 1, Mifflintown, Pa.

No. 169.—Farm of 100 acres, situated in Lack Township; near Perulack postoffice and railway station, on line of Tuscarora Valley Railroad; one and one-half miles from school; three miles from Methodist and Presbyterian churches; near milk station. Good roads. One-half of this farm is rolling and the other half is level. Soil is slate, flint gravel and river bottom. 45 acres in meadow; 20 acres in timber, good oak. Eighty acres tillables. Fruit: apples and grapes. Adapted to the production of corn, wheat, oats, rye and buckwheat. Good post and rail fences. House, 25x27 feet, in good

condition. Good barn, 36x69 feet. Wagon shed, hog house, chicken house, wood house and smoke house. House and barn are watered by wells; fields, by springs and running water. Price, \$3,000.00. Terms, to suit purchaser. Limestone on farm; one and one-half miles to draw kiln. Address J. A. Kennedy, Perulack, Pa.

No. 170.—Farm of 70 acres, situated in Greenwood Township; six miles from Millerstown, on line of Pennsylvania Railroad; one-half mile from school; one mile from Evangelical church. Good road. Surface is hilly but not rough. Gravel soil. Thirty acres in timber, young chestnut and rock oak. Forty acres are tillable. Fruit: apple, plum, pear and cherry. Adapted to general farm crops. House, 20x22 feet, seven rooms, frame and weather-boarded, in fair condition. Small barn, new carpenter shop, chicken house and wood house. House and barn are watered by well; fields, by running water. Price, \$850.00. Terms, one-half cash and balance to suit purchaser. There is enough timber cut and sawed on hand to build a barn and this is included. Enough timber to pay for farm. Address A. W. Zeiders, 602 Sixth avenue, Altoona, Pa.

No. 171.—Farm of 80 acres, located in Walker Township; six miles from Mifflintown postoffice, R. D. No. 2; three miles from railway station at Thompsett, on line of Pennsylvania Railroad; one mile from school; three miles from Lutheran church; three miles from creamery. Good roads. Surface is level. Limestone and gravel soil. Twenty acres in timber, yellow pine, ash and chestnut—will cut 100,000 feet. Sixty acres tillable. 60 apple, 20 cherry, some pear and plum trees, grapes, etc. Adapted to general farm crops and dairying. Whole farm is fenced with good wire fence. Eleven-room house, with hall and bath, in good condition. Barn, 38x60 feet. Straw shed, wagon shed and chicken house—all in good condition. Well and cistern at house with tank in house. Barn is watered by well and cistern. Price, \$6,500.00. Terms, to suit purchaser. This farm slopes slightly to the south. It is laid out in ten-acre fields. Address W. H. Slautterback, R. D. No. 2, Mifflintown, Pa.

Lackawanna County.

No. 172.—Farm of 25 acres, situated in Madisonville; near railway station at Moscow, on line of D. L. & W. Railroad; near school and church; one-fourth mile from creamery. Good state roads. Loam and gravel soil. Fifteen acres in meadow; 22 acres tillable. Fruit: Apple, plum and pear. Adapted to farm crops and garden truck. Wire fences. Good 7-room house. Barn, shed, poultry house and wood house. House is watered by well; barn and fields, by spring. Price, \$1,500.00. Terms, \$1,000.00 cash and balance on mortgage. Address Mrs. Ella Swingle, R. D., Ariel, Pa.

No. 173.—Farm of 40 acres, situated in Springbrook Township; one and one-half miles from Springbrook postoffice and railway station, on line of Wilkes-Barre & Easton Railroad; one mile from school and church; six miles from creamery; five miles from cheese factory. Part of the surface is level and part is hilly. Gravel soil. Twenty-five acres tillable. Adapted to general farm crops. No buildings. Farm is watered by two streams. Price, \$225.00. Terms, cash. This farm is located on the water shed of the Springbrook Water Company. There is a good flagstone quarry. Never-failing stream of spring water along one side of farm. Address C. J. Rechsteiner, 22 Park street, Carbondale, Pa.

No. 174.—Farm of 56 acres, situated in Springbrook Township; one mile from railway station at Viaduct, on line of Erie Railroad; one-fourth mile from school; three-fourths mile from church; six miles from creamery. Scranton is ten miles distant and has a population of 130,000. Surface is rolling. Good soil. 25 acres in pasture and 25 acres tillable. Fruit: 100 apple, 650 peach, 6 pear and 25 plum trees. Adapted to general farm crops. Good wire fences. Two-story house, 28x30 feet. Barn, 36x46 feet, two sheds, pig pen and other outbuildings. Buildings are watered by wells and fields, by creek. Price, \$3,000.00. Terms, cash. Address Edward Flyte, R. D. No. 3, Moscow, Pa.

Lancaster County.

No. 175.—Farm of 55 acres, situated in Sadsbury Township; one mile from Octoraro postoffice; seven miles from railway station at Christiana, on line of Pennsylvania Railroad; one-half mile from school; three miles from Methodist church; one-half mile from creamery. Good dirt roads. Surface is level except one field. Mostly clay loam soil. Three acres in meadow; four acres in timber, chestnut, hickory and oak. Whole farm is tillable except woodland. Orchard consisting of apple, peach, pear, cherry, etc. Adapted to general farming. Good fences principally wire. Stone and frame house, eight rooms, good condition. Frame bank barn, 35x45 feet. New hog pen, corn crib and spring house. Well in yard; water handy to barn; water in meadow. Price, \$3,000.00. Terms, cash. House has slate roof and two good cellars. Address Joshua P. Brosius, R. D. No. 1, Cochranville, Pa.

No. 176.—Farm of 43 acres, situated in Conoy Township; two miles from Bainbridge postoffice, R. D. No. 1; Bainbridge is on line of Pennsylvania Railroad; near school; one and one-half miles to church; three miles to creamery. Good roads, part pike. Surface is mostly level. Black loam soil. Six acres in timber, locust and maple. Thirty-five acres tillable. Apple orchard, good varieties of fruit. Well

adapted to tobacco, corn, etc. Post and rail and wire fences, in good condition. House, 26x34 feet, tin roof. Barn, 34x64 feet, tobacco shed, wagon shed, corn crib and pig sty. House and barn are watered by well. Price, \$4,500.00. Terms to suit purchaser. Address George Laughman, Bainbridge, Pa.

No. 177.—Farm of 192 acres, located in Martic Township; West Willow postoffice, R. D. No. 1; four miles from railway station at Pequea, on line of Lancaster & Quarryville railway; three-fourths mile from school; one mile from Methodist church; four miles from creamery. Hilly roads. Surface slopes to the north. 52 acres in timber, chestnut, oak and poplar. 140 acres tillable. 24 apple and 200 peach trees. Adapted to wheat, corn, oats, rye, potatoes and tobacco. Good line fences. Two-story frame house, ten rooms, good. Two barns, with corn barn and tobacco cellar. House is watered by well; barn, by cistern; fields, by small stream. Price, \$45.00 per acre. Terms, cash. Forty acres may be put into permanent pasture. During the four past years 20 head of steers have been fed on this farm. Address A. L. Eshbach, Willow Street, Pa.

Lawrence County.

No. 178.—Farm of 91 acres, located in Pulaski Township; four and one-half miles from Pulaski postoffice, R. D. No. 1; railway station at Pulaski, on line of Pennsylvania & Erie Railroad; one-half mile from school; one mile from church; one mile from milk station. Good roads. Surface is rolling. Altitude about 1,000 feet. Loam soil. Thirty acres in meadow; seventy-five acres tillable. Fruit: 50 apple trees, plums, cherries, etc. Adapted to general farming and gardening. Mostly wire fences, fair condition. New five-room house, slate roof. Bank barn, 45x65 feet, slate roof, good condition. Buildings are watered by well and fields, by run. Price, \$6,000.00. Terms, one-third cash and balance on easy terms. This farm is fine for dairying. Desire to sell in order to close an estate. Address Mrs. Josephine M. Walker, Pulaski, Pa.

No. 179.—Farm of 10 acres, situated in Neshannock Township; two and one-half miles from New Castle, R. D. No. 1; one-fourth mile from school and church. Macadam roads within one-half mile from farm. New Castle, the county seat, has a population of 36,000. Surface is slightly rolling. All tillable. Adapted to farming and trucking. Fairly good fences. No buildings. Price, \$85.00 per acre. Terms, \$300.00 cash and balance on mortgage. Address Mrs. Elizabeth Allan, R. D. No. 1, Evans City, Pa.

No. 180.—Farm of 60 acres, located in Big Beaver Township; three and one-half miles from New Galilee postoffice, R. D. No. 3; three miles from railway station at Wampum, on line of E. & P. Railroad;

one-third mile from school; three miles from United Presbyterian, Presbyterian and Methodist churches; three miles from milk station; one and one-half miles from creamery. Good dirt roads. Nearest city is New Castle, seven miles distant, population, 36,000. Surface is slightly rolling. Gravel and black loam soil. Thirty-two acres in meadow. Whole farm is tillable. 40 apple, 20 peach, 20 pear and 10 cherry trees. Adapted to wheat, corn and oats. Wire fences, in good repair. Eight-room cottage house, hot air heating, remodeled in 1914. Barn, 36x56 feet, slate roof. Summer house, corn crib and hen house. House and barn are watered by wells; fields, by running water. Price, \$5,000.00. Terms, \$2,000.00 cash and balance to suit purchaser. This farm is in the oil and gas territory. Address S. W. Wilson, New Gallilee, Pa.

No. 181.—Farm of 76 acres, situated in Scott Township; five miles from East Brook postoffice, R. D. No. 1; four miles from railway station at Grant, on line of Bessemer & Lake Erie Branch Railroad; one mile from school; one mile from Methodist, Baptist, Presbyterian and United Presbyterian churches. Roads are good and comparatively level. Surface is rolling with some small hills. Altitude about 1,250 feet. Soil is gravel and black loam. Sixteen acres in meadow; ten acres in timber, oak, maple, beech, etc. Sixty acres tillable. Orchard. Adapted to wheat, oats, corn and vegetables. Some good wire fence, others not very good. Ten-room house, in good condition. Remodeled log barn, 85 feet long, corn crib, etc. House and barn watered by well; fields, by spring and run. Price, \$85.00 per acre. Terms, part cash and balance on time. A good neighborhood. Bell telephone. Owners, James H. Lockes' Heirs. Address A. C. Locke, Trustee, 606 Wood street, Clarion, Pa.

No. 182.—Farm of 61 acres, situated in Pulaski Township; two and one-half miles from Pulaski postoffice, R. D. No. 1; railway station at Pulaski is one line of Pennsylvania and Erie Railroads; one-half mile from school; two miles from church; one mile from milk station. Good roads. Surface is rolling. Altitude, 1,080 feet. Clay and loam soil. Thirty acres in meadow. Whole farm is tillable. 215 apple, 50 cherry, 30 plum and 10 pear trees. Grapes, raspberries and gooseberries. Adapted to general farming. Wire, picket and rail fences, in fair condition. Frame house, seven rooms, slate roof, in good condition. Bank barn, 30x40 feet, fair condition. Two-story spring house, granary and chicken house. House is watered by spring; watering trough at barn; fields are watered by spring run. Price, \$80.00 per acre. Terms, reasonable. More land may be purchased adjoining this farm. Suitable for gardening and fruit growing. Address A. M. Walker, R. D. No. 1, Pulaski, Pa.

Lebanon County.

No. 183.—Farm of 132 acres, situated in Union Township; one and one-half miles from Onset postoffice, R. D. No. 1; one mile from railway station at Green Pont, on line of Lebanon and Tremont Railway; one-fourth mile from school and church; one mile from milk station. Some of the roads are good and others are rough and hilly. Surface varies from level and rolling to rough and hilly. Gravel and sand soil. About 20 acres in meadow; thirty acres in timber, chestnut, oak and pine. Balance of the farm is tillable. Apple, peach, pear, plum and cherry trees. Adapted to wheat, rye, corn, oats and potatoes. Wire and rail fences, not in good condition. Stone house, eight rooms, not in good condition. Large log barn, stone summer house, etc. House and barn are watered by spring and well; fields, by creek and mountain stream. Price, \$1,000.00. Terms, cash. Address Elizabeth Fehler, 22 North Eighth St., Lebanon, Pa.

Luzerne County.

No. 184.—Farm of 76 acres, situated in Dallas Township; two miles from Dallas postoffice, R. D. No. 2; one-fourth mile from railway station at Outlet and Chestnut Siding, on line of Lehigh Valley Railroad; one-half mile from school and church. Roads are mostly good. Surface is part nearly level and part hilly. Soil is clay loam. Ten acres in meadow; about 25 acres in timber, oak and chestnut. About 50 acres are tillable. Apple, plum and cherry orchard. Adapted to forage and grain crops. Small house. Barn, in fair condition. Fine spring near house. Barn is watered by spring run and fields, by springs and brook. Price, \$2,000.00. Terms, easy. This farm has not been occupied for sometime and has never been worked out. Lies in dairy section and adjoining land sells up to \$100.00 per acre. Address L. R. Lutes, R. D. No. 2, Dallas, Pa.

No. 185.—Farm of 144 acres, located in Packer Township; two miles from Beaver Meadows postoffice and railway station, on line of Lehigh Valley and Reading Railroads; one-half mile from school; one mile from church; two and one-half miles from milk station. Good highways. Hazleton is five miles distant and has a population of 25,000. Surface is level. Rich soil. Twenty-five acres in meadow. 28 apple and some pear and cherry trees. Adapted to potatoes, corn and cabbage. No buildings. Price, \$700.00. Terms, cash. Good water. Address Michael Stropkosky, Box 134, Nesquehoning, Pa.

No. 186.—Farm of 62 acres, situated in Union Township; three miles from Shickshinny postoffice and railway station, on line of D. L. & W. Railroad; one mile from school and church; three miles from condensing plant. Roads are good but hilly in places. Surface

is rolling. Good soil. Ten acres in meadow; three in timber, chestnut, oak and pine. About 50 acres tillable. Two large apple orchards, pears, plums and cherries. Adapted to grain, potatoes and hay. Good stone fences. Good seven-room house with kitchen, halls and pantry. Barn, hog house and wagon shed. Buildings are watered by spring. Price, \$2,600.00. Terms, one-half cash and balance in payments. This farm is leased until April 1, 1917. Address Mrs. Clara C. Hartman, 852 South Franklin St., Wilkes-Barre, Pa.

No. 187.—Farm of 225 acres, located in Salem Township; one mile from railway station at Hicks Ferry, on line of D. L. & W. Railroad; one-eighth mile from school; two miles from church. Excellent level roads. Surface is slightly rolling. Altitude, 500 feet. Sandy loam soil. Thirty acres in meadow and seven acres in hardwood timber. 215 acres tillable. Fruit: 500 apple, 500 peach and 50 plum and pear trees. Adapted to general farm crops and vegetables. Good line fences. Two houses, in good condition. Two large barns. One large shed and corn crib. Water is piped to house and barn. Price, \$11,000.00. Terms, small payment down and balance on time. This is one of the best farms in the State and is located just outside the hard coal regions. Large population near and good markets. Address J. B. Rickard, Residuary Trustee, 37 Bennet Building, Wilkes-Barre, Pa.

No. 188.—Farm of 56 acres, situated in Dorrance Township; eight miles from Wapwallopen postoffice, R. D. No. 2; railway station at Wapwallopen, on line of P. R. R.; one-half mile from school; two and one-half miles from church; three miles from creamery. Good roads. Surface is rolling. Altitude, 1,200 feet. Red shale and clay soil. Ten acres in meadow; ten acres in timber, hardwood; forty-five acres tillable. Fruit: 225 apple, 50 cherry, 40 peach, 40 plum 25 pear and 25 quince trees. Adapted to grain, hay, fruit and truck. Seven-room house, in good condition. Barn and shed, 42x56 feet, good condition. Buildings are watered by spring. Price, \$3,700.00. Terms, cash and mortgage. The price includes livestock, implements, etc., if sold soon. Address William G. Taney, R. D. No. 2, Wapwallopen, Pa.

Lycoming County.

No. 189.—Farm of 100 acres, situated in Cascade Township; one mile from Kellyburg postoffice; six miles from railway station at Bodine, on line of Pennsylvania Railroad; three-fourths mile from school; two miles from Catholic church. Roads are hilly but of good uniform grade. Surface is largely rolling to level. About 35 acres in meadow; 65 acres in timber, second growth hemlock and hardwood. Whole farm can be tilled if cleared. 20 large apple trees.

Adapted to pasture and fruit. No buildings. Spring and two streams of water. Price, \$600.00. Terms, one-half cash and balance on time. This would make an ideal fruit farm as it is in the apple belt. This land is not stony or rough. Address Bert H. Hayes, Cogan Station, Pa.

No. 190.—Farm of 176 acres, located in Upper Fairfield Township; four miles from Montoursville postoffice, R. D. No. 3; railway station at Montoursville, on line of Phila. & Reading Railway; three-fourths mile from school and church; three miles from creamery. Good roads. Williamsport, the county seat, is eight miles distant and has a population of 32,000. Surface is level. Sandy loam soil. Nine acres in meadow; 30 acres in timber, young oak, chestnut, hemlock, etc. 110 acres tillable. Fruit: Apple, peach and paragon chestnuts. Adapted to general farm crops. Mostly woven wire fences, in good condition. Brick house, nine rooms, good condition. Bank barn, 30x50 feet good condition. Straw shed, granary, wagon shed and corn crib. House and barn are watered by pump. Price, \$15,000.00. Terms, to suit purchaser. Located on the Loyalsock, one of the purest streams in Pennsylvania. Good trout fishing. Summer resort. Address Dr. B. H. Tallman, Williamsport, Pa.

No. 191.—Farm of 30 acres, situated in Muncy Creek Township; two and one-half miles from railway station at Muncy, on line of Penna. & Reading Railroads; three-fourths mile from school and church; two miles from condensing plant. Roads are level and in good order. Surface is as level as a garden. Altitude, 500 feet. Gravelly loam soil. Six acres in meadow; three acres in timber, sycamore and oak. All tillable if cleared. Fruit: 200 apple, 30 pear, 15 plum and some apricot and crab apple trees. Well adapted to wheat, corn, oats, potatoes and farm crops generally. First class fences. Twelve-room mansion house with porches and lawn. Barn, wagon shed, ice house, wood and coal house, etc. Trout and bass fishing. Fine bathing. House and barn are watered by wells; fields by running water. Price, \$5,000.00. Terms, part cash and balance on time. This is the finest farm house in Lycoming County. Desire to sell because of ill health. Address Rev. U. Myers, D. D., Catawissa; Pa.

No. 192.—Farm of 27 acres, situated in Limestone Township; three miles from railway station at Jersey Shore, on line of Phila. & Erie Railroad near school; one mile from church. Good State highway. Surface is slightly rolling. Altitude 1,200 feet. Good limestone soil. Whole tract is tillable and under the plow at the present time. Fruit: 100 peach, 65 apple, 25 plum and 6 pear trees. Adapted to wheat, oats, corn, clover, potatoes, fruit and vegetables. Good 10-room house. Basement barn, 30x40 feet, in fair condition.

Hog house, hen house, granary, corn crib, wagon shed, ice house and wood house. Buildings are watered by cisterns. Price, \$2,500.00. Terms, part cash and balance on time. This farm is underlaid with splendid limestone. Buildings could not be duplicated for twice the amount asked for the farm. Address Mrs. James Cockburn, Wellsboro, Pa.

McKean County.

No. 193.—Farm of 268 acres, situated in Liberty Township; five miles from Port Allegany postoffice, R. D. No. 1; railway station at Port Allegany, on line of Penna. Railroad; one and one-half miles from school and church. Good level roads. Surface is rolling. Very productive soil. Twenty-five acres in meadow; 168 acres in hardwood timber. 100 acres tillable. Orchard of winter apples principally. Adapted to general farm crops. House, 16x34 feet, fair condition. Barn, 61x26 feet. Buildings and fields are watered by springs. Price \$2,200.00. Terms, \$800.00 cash and balance to suit purchaser. Whole farm is tillable if cleared. Address Mrs. E. D. Chase, Port Allegany, Pa.

No. 194.—Farm of 211 acres, situated in Wetmore Township; one mile from Burrows postoffice, R. D. No. 6; station on farm on line of B. & O. Railroad; one-fourth mile to church. State highway. Kane is one and one-half miles distant and has a population of 8,000. Sandy and clay soil. 30 acres in meadow; 140 acres tillable. Sixty apple trees. Adapted to wheat, rye, oats and potatoes. Wire fences, fair condition. Six-room house, in good condition. One new barn, 40x110 feet, cost four thousand dollars. One barn, 40x80 feet, in good condition. Three large sheds. House is watered by well; water piped to barn. Price, \$12,000.00. Terms, one-half cash and balance in payments. This is the best farm in the county. The price asked is only one-half the value. Address James McDade, Kane, Pa.

Mercer County.

No. 195.—Farm of 200 acres, situated in South Worth Township; three miles from Jackson Center postoffice and railway station, on line of Penna. Railroad; one-half mile from school; one mile from church. State road. Grove City is six miles distant and has a population of 5,000. Surface is rolling. Altitude about 1,350 feet. Black loam and sand soil. 40 acres in meadow; 25 acres in timber. 150 acres tillable. One hundred bearing apple trees and some fruit of other kinds. Adapted to hay, oats, corn, wheat and buckwheat. Wire and rail fences. Good brick houses, ten rooms, 30x45 feet. One barn, 40x72 feet; another barn, 20x40 feet. Buildings and fields are

watered by springs. Price, \$45.00 per acre. Terms, one-half cash and the balance in payments. Underlaid with two veins of coal. Building trolley line through the farm. Address Wilbur J. Wilson, R. D. No. 18, Jackson Center, Pa.

No. 196.—Farm of 150 acres, located in Delaware Township; three miles from Transfer postoffice, R. D. No. 51; railway station at Transfer, on line of Penna. & Erie Railroad; one-fourth mile from school; two miles from church. Good roads. Surface is rolling. Sandy soil. 48 acres in meadow; 16 acres in timber, chestnut, poplar and oak. 135 acres tillable. 75 apple, 40 peach, 15 plum, 8 pear and six cherry trees. Adapted to dairying and general farming. Woven wire, picket and rail fences. House, 18x30 feet. Barn, 33x68 feet. Buildings are watered by wells and fields by springs. Price, \$9,000.00. Terms, to suit purchaser. Address Frank Reznor, R. D. No. 50, Transfer, Pa.

No. 197.—Farm of 76 acres, situated in West Salem Township; six miles from Greenville postoffice, R. D. No. 45; two miles from Orangeville, on line of Erie Railroad; one mile from school; two miles from church and cheese factory. Roads are slightly hilly. Greenville has a population of 6,000. Surface is slightly rolling. Altitude, 1,200 feet. Good clay loam soil. 30 acres in meadow; 30 acres in pasture; 16 acres in timber, poplar, oak and chestnut. 30 acres tillable. Apple and peach orchard. One-third acre of raspberries. Adapted to wheat, oats, corn, potatoes and hay. Rail and wire fences, fair condition. Seven-room house, in fair condition. Cow barn, 35x45 feet, with basement. Horse barn, 24x34 feet. Necessary outbuildings—all in good condition. Buildings are watered by wells and fields by spring run. Price, \$3,500.00. Terms, \$1,000 cash and balance in easy payments to suit purchaser. Address J. Simpkins, R. D. No. 45, Greenville, Pa.

No. 198.—Farm of 44 acres, situated in Delaware Township; one mile from Kremis postoffice and railway station, on line of B. & L. E. Railroad; three-fourths mile from school; one mile from church; four and one-half miles from milk station. Good first class roads. Surface is rolling. Altitude, 800 feet. Dark loam soil. Eleven acres in meadow; seven acres in timber, maple, beech, elm and hickory. Apple, peach, plum and cherry orchard. Adapted to corn, oats, wheat, buckwheat, rye and potatoes. Good wire and rail fences. Two story frame house, 30x36 feet, good condition. Barn, stable, chicken house, smoke house, all in good condition. Farm and buildings are watered by wells. Price, \$2,250.00. Terms, cash. Address Charles W. Smith, R. D. No. 49, Greenville, Pa.

No. 199.—Farm of 216 acres, situated in Pymatuning Township; two and one-half miles from Transfer postoffice, R. D. No. 52; rail-

way station at Transfer, on line of Shenango, Bessemer and Penna. Railroads; one mile from a school; two and one-half miles from church; four miles from cheese factory. Good roads. Surface is level. Altitude, about 1,000 feet. Good clay and dark loam soil. 45 acres in meadow; 75 acres in timber, poplar, oak, beech and sugar maple. 125 acres tillable. Fruit: Apple, peach, pear and plum orchard. Adapted to general farm crops. Rail, picket and wire fences, in fair condition. 10-room house with halls, cellar and attic. Barns, 40x60 feet and 30x40 feet, respectively. Wagon shed, smoke house and hen house. House is watered by drilled well; running water at barn; fields are watered by two streams. Price, \$70.00 per acre. Terms, one-half cash and balance to suit purchaser. This is not a run down or abandoned farm. Address Homer & Durst, Transfer, Pa.

No. 200.—Farm of 60 acres, situated in Otter Creek Township; six miles from Greenville, R. D. No. 47; two miles from railway station at Kremis, on line of Bessemer Railroad; one mile from school and church two miles from milk station. Level roads. Surface is rolling. Sandy clay loam soil. 40 acres in meadow; 20 acres in timber; 40 acres tillable. Apple orchard. Adapted to corn, wheat, oats, timothy and clover. Rail and wire fences, in good condition. One and one-half story house, eight rooms, fair condition. Barn, 37x50 feet, good white oak frame, in good repair. Well at porch and good spring near. Well at barn. Running water in pasture. Price, \$2,400.00. Terms, cash. Telephone in house. The timber land is not thickly wooded and makes good pasture land. Thirty acres adjoining this farm has been offered for sale. Address Daniel J. Wilaman, R. D. No. 47, Greenville, Pa.

No. 201.—Farm of 60 acres, located in Sandy Lake Township; five miles from Sandy Lake postoffice, R. D. No. 23; two miles from railway station at Raymilton, on line of New York Central Railroad; one mile from school; two miles from church. Good roads. Surface is rolling. Altitude, about 1,200 feet. Sandy and loam soil. 15 acres in meadow; 15 acres in timber, maple, oak and chestnut; 45 acres tillable. 200 apple and some pear, peach and plum trees. Usually sufficient fruit for family use. Adapted to corn, wheat, rye and grass. Rail and wire fences, fair condition. Seven-room house, fair condition. Barn, 40x50 feet. Buildings are watered by wells and fields by stream. Price, \$3,500.00. Terms, cash. This farm is near oil field. Wells on adjoining farm. Address W. E. Armstrong, R. D. No. 65, Volant, Pa.

No. 202.—Farm of 106 acres, situated in Worth Township; four and one-half miles from Jackson Center postoffice, R. D. No. 18; railway station at Jackson Center is on line of Pennsylvania Railroad; one

mile to school and church. Public roads are in good condition. Surface is slightly rolling. Altitude, 1,300 feet. Sandy loam soil. Twenty acres in meadow; 70 acres tillable. Excellent orchard. Adapted to wheat, rye, oats, corn, buckwheat and hay. Wire and rail fences, in fair condition. Ten-room house, in good condition. Bank barn, 45x53 feet. Poultry house, wagon shed, and hog house. House and barn are watered by wells; spring in pasture. Price, \$52.00 per acre. Terms, \$3,000.00 cash and balance in two years. Splendid location. Good schools and churches. Telephone line passes house. This is a good farm. Orchard is a good revenue producer some years. Address Mary E. Crawford, R. D. No. 18, Jackson Center, Pa.

No. 203.—Farm of 135 acres, situated in West salem Township; four miles from Jamestown postoffice, R. D. No. 42; five miles from railway station at Greenville, on line Erie and other railroads; one-half mile from school; two miles from Baptist church; one mile from cheese factory. Good dirt roads. Surface is slightly rolling. Altitude, 1,250 feet. Clay loam soil. 110 acres in meadow and pasture; 25 acres in timber, chestnut, ash, poplar and bass. Practically all tillable except the woodland. 100 apple and some plum and cherry trees. Adapted to corn, oats, wheat, potatoes, etc. Wire and rail fences, in good condition. Cottage style house, nine rooms. Barn, 40x60 feet, with straw shed and manure shed. Carriage house and hen house. Drilled well at house and barn; fields are watered by springs. Price, \$70.00 per acre. Terms, part cash and balance on time. The timber on this farm is worth \$2,000.00 and the buildings \$3,000.00. Address J. N. Calvert, R. D. No. 42, Jamestown, Pa.

No. 204.—Farm of 150 acres, situated in East Lackawannock Township; two miles from Mercer postoffice, R. D. No. 1; railway station at Mercer, on line of Bessemer and Pennsylvania Railroads; one mile from school; two miles from church. Good roads. Surface of this farm is mostly rich fertile valley. Altitude 1,140 feet. Sandy loam soil. About 80 acres in meadow; 15 acres in timber, oak and chestnut. 100 acres tillable. Apple, pear, peach and plum orchard. Adapted to corn, oats, wheat, and clover. Post and wire fences. Modern frame house, two story, 27x36 feet. Barn, 40x60 feet, with cement basement. Carriage house, hog pen and chicken house. House and barn are watered by springs; fields by running water. Price, \$75.00 per acre. Terms, to suit purchaser. House has nine rooms, two halls and bath room; hardwood finish throughout; hot and cold water on both floors-gravity system; hot air furnace. Address G. H. Wilson, Mercer, Pa.

No. 205.—Farm of 162 acres, located in East Lackawannock Township; two and one-half miles from Mercer postoffice, R. D. No. 1; Mercer is on line of Pennsylvania and Bessemer railroads; one-fourth

mile to school; two and one-half miles to church. Good public roads, mostly level. Surface is part level and part rolling. Altitude, 1,300 feet. Sandy and clay loam soil. About 70 acres in meadow; 20 acres in timber, oak, ash, and chestnut. 140 acres tillable. Small apple orchard. Adapted to wheat, corn, oats, clover and timothy. Post and wire fences. Two story house, nine rooms, in good condition. Barn, 48x58 feet, with basement. Hog house and large wood house. Buildings and fields are watered by springs. Price, \$50.00 per acre. Owners, James Reed's Heirs. Address G. H. Wilson, Manager, Mercer, Pa.

No. 206.—Farm of 88 acres, situated in West Salem Township; one mile from Greenville postoffice, R. D. No. 45; Greenville is on line of Bessemer, Erie and Pennsylvania Railroads; one-half mile from school; one mile from church; two miles from creamery; one mile from milk station. Good smooth country roads. Surface is level. Altitude, about 1,250 feet. Clay loam soil. Some timber. Whole farm is tillable. Excellent fruit land above the frost zone. Adapted to general farm crops. Rail fences, good condition. No buildings. Drilled well at the house site. Water in the fields most of the time. Price, \$4,000.00. Terms, to suit purchaser. This proposition will stand investigation. Write for particulars. Address Levi Morrison, Greenville, Pa.

No. 207.—Farm of 57 acres, situated in Delaware Township; three and one-half miles from Transfer postoffice, R. D. No. 50; railway station at Transfer, on line of Erie and Pennsylvania Railroads; one-half mile from school; one mile from German Reformed church; three miles from creamery. Good roads. Surface is slightly rolling. Altitude, 1,000 feet. Clay soil. 30 acres in meadow; 40 acres tillable. Apple, plum and pear orchard. Adapted to corn, oats and hay. Wire and rail fences, in good repair. Seven-room house, slate roof, in good repair. Barn, 37x40 feet, shed attached, in fair condition. New chicken house. Buildings are watered by wells. Price, \$2,600.00. Terms, to suit purchaser. The price is low for this farm. Address T. U. Titus, R. D. No. 50, Transfer, Pa.

No. 208.—Farm of 118 acres, situated in Delaware Township; three and one-half miles from Transfer postoffice, R. D. No. 50; Transfer is on line of Erie and Pennsylvania Railroads; one-fourth mile from school; one mile from church; three miles from creamery. One mile to state road. Surface is rolling. Sand and gravel soil. Altitude, 1,000 feet. 25 acres in meadow; 20 acres in timber, chestnut, and white oak. 100 acres tillable. Fruit: apple, peach, plum, pear and cherry trees. Adapted to wheat and corn. Woven wire fences, in good condition. Seven-room house in good condition. Barn, 40x50 feet. Necessary outbuildings. House and barn are watered

by wells. Water in all the fields. Price, \$6,500.00. Terms, to suit purchaser. Near good market. Address T. U. Titus, Transfer, Pa.

No. 209.—Farm of 96 acres, situated in Lackawannock Township; three miles from New Wilmington postoffice, R. D. No. 63; one and one-half miles from railway station at Bethel, on line of B. & O. R. R.; one-fourth mile from school; five minutes from Presbyterian church. Good roads. Surface is part level and part rolling. Good clay soil. 32 acres in meadow; 7 acres in timber, maple and beech; about 90 acres tillable. 100 apple, 50 peach, 25 cherry and 10 pear trees. Adapted to corn and oats. Good rail and wire fences. Good house, 30x40 feet. Barn, 40x50 feet. Buggy house, corn crib and chicken house. Fields and buildings are watered by springs. Price \$60.00 per acre. Terms, to suit purchaser. House and barn have slate roofs. Water in house and barn. Address Frank W. McCoy, New Wilmington, Pa.

No. 210.—Farm of 100 acres, situated in Pine Township; one and one-fourth miles from Grove City postoffice, R. D. No. 11; Grove City is on line of Bessemer Railroad; one and one-fourth miles from school and church; one and one-fourth miles from creamery and cheese factory. Gravel roads nearly level. Sandy loam and gravel soil. Altitude, about 1,400 feet. 25 acres in meadow; 25 acres in timber; 75 acres tillable. Apple, peach, pear and cherry trees. Adapted to wheat, corn, oats, potatoes and hay. Wire and rail fences, not in very good condition. House, 24x32 feet, painted, in good condition. Barn, 50x60 feet, new slate roof. Water in kitchen. Spring at barn and spring run in fields. Price, \$10,000.00. Terms, part cash and balance on time. Land is in good state of cultivation. Desire to sell because of ill health. Address T. A. Eakin, Grove City, Pa.

Mifflin County.

No. 211.—Farm of 116 acres, situated in Bratton Township; ten miles from Lewistown, R. D. No. 2; one and one-half miles from railway station at Homingford, on Pennsylvania Railroad; one-half mile from school; one-eighth mile from Methodist and Brethren churches; four miles to milk station. Roads are fairly good. Surface is part level and part rolling. Sandy loam and shale soil. 70 acres in timber, locust, chestnut, oak, etc. 46 acres tillable. 100 apple and some cherry, plum, pear and quince trees. Adapted to fruit and general farm crops. Barbed wire, woven wire and rail fences, in good condition. Almost new house, 22x26 feet, with annex, seven rooms. Good basement barn, 40x60 feet. All necessary out-buildings built five years ago. Buildings and fields are watered by running water. Price, \$3,000.00. Terms, cash. This is an excellent stock and fruit farm. Address P. L. Aurand, R. D. No. 2, Lewistown, Pa.

Monroe County.

No. 212.—Farm of 80 acres, situated in Barrett Township; two miles from Canadensis postoffice, R. D. No. 1; four miles from railway station at Cresco, on line of D. L. & W. Railroad; one-fourth mile from school; one mile from church; one mile from milk station. Good roads. Surface is level. 50 acres in meadow; thirty acres in timber, oak and chestnut. 40 acres tillable. Fruit: apple, cherry, peach and pear trees. Adapted to corn, rye, oats and buckwheat. Good wire fences. Two story frame house, twelve rooms. Two story cottage house. Barn, 30x45 feet. Wagon shed, ice house, pig pen, chicken house and wood shed—all in good condition. Spring water in the house. Streams in the fields. Price, \$6,000.00. Terms, part cash and balance to suit purchaser. This place is suitable for farming or the keeping of boarders. Good market. Address Mrs. I. B. Edwards, Canadensis, Pa.

No. 213.—Farm of 15 acres, situated in Chestnuthill Township; six miles from Saylorsburg postoffice, R. D. No. 2; Saylorsburg is on the line of the L. & N. E. Railroad; three-fourths mile from school; two miles from Reformed, Lutheran and Methodist churches. Roads are fair to good. Surface is somewhat hilly. Altitude, 800 feet. Gravelly loam soil. Three acres in meadow; four acres in timber, chestnut and rock oak; ten acres tillable. Fruit consists of apples, pears, peaches, plums, grapes, currants and raspberries. Adapted to truck and chickens. Good line fences. Two story slate roof house, 16x32 feet and annex, in good condition. Spring water piped into house. Price, \$1,200.00. Terms, \$300.00 cash and balance to suit purchaser. Ideal location for poultry plant. Protected from northwest storms. Slopes to the southeast. Never-failing spring of water. Address F. S. Brong, Saylorsburg, Pa.

No. 214.—Farm of 37 acres, located in Stroud Township; one and one-half miles from Stroudsburg, the county seat, R. D. No. 2; one and one-half miles from school and church; one and one-half miles from creamery. State highway. Surface is mostly level. Loam clay soil. Six acres in meadow; four acres in timber, second growth. 25 acres tillable. Fruit: 60 apple, 40 pear, and 20 plum trees. Adapted to corn, wheat, oats, rye and hay. Good wire fences. House, 32x36 feet, seven rooms and bath, two story frame, in good condition. Barn, 38x48 feet. Wagon shed, corn crib, chicken house, wash house, etc. Hot and cold water in the house. Running water at the barn. Running water in fields. Price, \$5,000.00. Terms, part cash and balance on time. Considered one of the finest farms in the valley. House is heated by hot air furnace. Good location for fish dam. Well suited for summer boarders. Address Mrs. Davis Hartman, R. D. No. 2, Stroudsburg, Pa.

No. 215.—Farm of 103 acres, situated in Polk Township; five miles from Kunkletown postoffice, R. D. No. 2; one-fourth mile from school; one and one-half miles from Reformed and Lutheran churches; one and one-half miles from creamery. State highway. Surface is slightly rolling. Pencil slate and blue clay soil. 18 acres in timber; 85 acres tillable. Fruit of all kinds. Adapted to general farm crops. Good wire fences. Two and one-half story house, 28x32 feet, in good repair. Barn, 35x80 feet. Straw shed and pig sty. House is watered by springs; barn, by well and fields by running stream. Price, \$4,000.00. Terms, \$2,000.00 cash and balance on time. Address M. D. Bush, R. D. No. 2, Kunkletown, Pa.

No. 216.—Farm of 85 acres, situated in Ross Township; one and one-half miles from Gilbertsville postoffice, R. D. No. 2; four miles from railway station at Kunkletown, on line of Chestnut Ridge Railroad; one mile from school; one and one-half miles from Reformed and Lutheran churches; one mile from creamery. Good roads. Altitude, 920 feet. Five acres in meadow; 20 acres in timber, pine, chestnut and oak; 65 acres tillable. Good orchard of different kinds of fruit, hickory and chestnut trees. Adapted to rye, oats, corn, buckwheat and potatoes. Good wire fence. House, 24x32 feet, eight rooms, very good condition. Barn, 32x42 feet. Shop, woodhouse, corn crib, pig sty and wagon shed. House and barn are watered by wells. Price, \$1,800.00. Terms, \$600.00 cash and balance on mortgage. Address J. B. Goranflo, R. D. No. 2, Kunkletown, Pa.

Montgomery County.

No. 217.—Farm of 44 acres, situated in Upper Hanover Township; three-fourths mile from Palm postoffice, R. D. No. 1; railway station at Palm, on line of Philadelphia & Reading Railway; three-fourths mile from school and church (Reformed and Lutheran); three-fourths mile from milk station and condensing plant; one and one-half miles from creamery and condensery. Limestone pike road. Surface is part rolling and part level. Black loam soil. Six acres in meadow; four acres in timber, large oak and hickory. Thirty-eight acres tillable. Apple, peach, pear, cherry and quince orchard. Adapted to general farm crops. Wire fences, in good condition. Good six room house and kitchen, slate roof. Good bank barn. Necessary out-buildings, all in good condition. Buildings are watered by pump; fields are watered by spring. Price, \$3,500.00. Terms, \$900.00 cash and balance on easy terms. My share of crops and good binder goes with sale. Address Dick McConnal Matson, Jenks street, Brookville, Pa.

No. 218.—Farm of 68 acres, situated in Limerick Township; four miles from Schwenksville postoffice, R. D. No. 2; three miles from

railway station at Zeiglersville, on line of Perkiomen Railroad; one mile from school and creamery; one-half mile from church. Part of the farm is level, part rolling and part hilly. About eight acres in meadow; ten acres in timber, oak, cedar, chestnut, etc. About 40 acres tillable. Adapted to fruit, corn, clover and grass. Melons do well. Stone house, ten rooms, needs some repairs. Barn. House is watered by well and spring; barn by spring and fields by streams. Price, \$40.00 per acre. Terms, part cash and balance on mortgage at 5½ per cent. This farm is assessed at \$2,600.00. Address Isaac P. Rhoades, Trappe, Pa.

No. 219.—Farm of 24 acres, located in Frederick Township; one mile from Perkiomenville postoffice, R. D. No. 1; railway station at Perkiomenville on line of Perkiomen Railroad; school on premises; two and one-half miles to church; three-fourths mile to creamery, milk station, store and mill; one mile from condensing plant. Stone roads, in fairly good condition. Pottstown is ten miles distant and has a population of 25,000. Farm slopes enough to drain well. Dark loam soil. Altitude is high and healthy. Three and one-half acres in timber, hickory, walnut, oak and cedar. Seventeen acres tillable. Fruit: apple, pear, cherry, plum, grapes and berries. Adapted to wheat, rye, oats, corn and potatoes. Wire and stone fences, fairly good condition. New seven-room house, part frame and part stone. Stone stable, pig sty, chicken house, stabling for five cows and two horses. House and barn are watered by wells; fields, by spring. Price, \$2,250.00. Terms, one-half cash and balance on time at five per cent. Address George E. Schmidt, R. D. No. 1, Green Lane, Pa.

No. 220.—Farm of 71 acres, situated in Horsham Township; two miles from railway station at Hatboro, on trolley line; three-fourths mile from school, church and condensing plant; two miles from cheese factory. Stone roads. Surface is rolling. Very good loamy soil. Four acres in meadow; four acres in timber, oak, hickory and chestnut. Sixty-seven acres tillable. Fruit consists of peaches and apples. Adapted to general farm crops. Wire fences, in good condition. Stone house, fourteen rooms, in good condition, fine old shade. Stone barn with two floors and plenty of stabling. Necessary outbuildings, in good condition. House is watered by spring; barn by pump; fields, by spring. Price, \$10,500.00. Terms, easy. This is an exceptional good farm. Address Wilmer A. Wood, Horsham, Pa.

No. 221.—Farm of 61 acres, located in New Hanover Township; four miles from Green Lane postoffice, R. D. No. 1; three and one-half miles from railway station at Pennsburg, on line of Philadelphia & Reading Railway, one-fourth mile from school; one mile from Re-

formed and Lutheran churches; one mile from creamery and cheese factory. Good roads. Surface is nearly level. Gravel loam soil. Four acres in meadow; twelve acres in timber, oak, hickory, chestnut and walnut. Forty-four acres tillable. Fruit: 50 peach, 12 apple and ten cherry trees, 1,000 strawberry plants, currants, raspberries and blackberries. Adapted to oats, corn, wheat, rye, potatoes and tomatoes. Barbed wire and post and rail fences, fair condition. Eleven-room house, bath, hot and cold water, acetylene lighting plant. Stone and frame barn, 30x60 feet. Chicken house, corn crib and pig sty. Complete water system in house. Well at barn and streams in the fields. Price, \$3,500.00. Terms, \$900.00 cash and balance to remain at five per cent. Livestock, implements, grain, feed and poultry are included with farm. This proposition is worth considering. Address Edward M. Nunan, R. D. No. 1, Green Lane, Pa.

No. 222.—Farm of 126 acres, located in Lower Providence Township; one mile from Eagleville postoffice; three miles from railway station at Collegeville, on line of Perkiomen Railroad; one-fourth mile from school; one mile from Presbyterian and two miles from Baptist churches; three miles from creamery and milk station. Roads are nearly all good. Norristown, the county seat, is six miles distant and has a population of 30,000. Surface is level, rolling and hilly. Some of the soil is clayey, some gravelly and some stony. About 30 acres in meadow; five acres in timber, largely heavy white oak; ninety one acres tillable. 100 apple, 60 peach, and some pear and quince trees. Adapted to wheat, hay, potatoes, oats and corn. Mostly wire fences. House for two families, seventeen rooms in fair condition. Barn, 50x75 feet. Wagon shed, hog pen, chicken house, corn crib, etc. Running water at house and barn. Fields are watered by spring and creek. Price, \$9,000.00. Terms, cash. Address Isaac A. Longacre, Eagleville, Pa.

No. 223.—Farm of 154 acres, situated in Lower Pottsgrove Township; three miles from Pottstown, R. D. No. 4; two miles from railway station at Sanatoga, on line of Philadelphia & Reading Railway; one-eighth mile from school; two miles from Lutheran and Reformed churches; two miles from creamery, cheese factory and milk station. State highway. Surface is slightly rolling just enough for good drainage. Gravel and ironstone clay soil. Fifteen acres in meadow; ten acres in timber, oak, hickory and poplar. Apple, pear and cherry orchard. Adapted to corn, wheat and oats. Good post, stake and wire fences. House, 32x42 feet, with addition, sixteen rooms, hot air heating, bath, hot and cold water. Barn, 45x85 feet. Wagon shed, hay and grain shed, corn crib, hen house and other outbuildings. Hot and cold water in house, spring at barn and streams in fields. Price, \$9,000.00. Terms, easy. Buildings, are nearly new. Address Dr. H. B. Erb, 225 North 12th street, Allentown, Pa.

Northampton County.

No. 224.—Farm of 283 acres, situated in Upper Mt. Bethel Township; one mile from North Bangor postoffice and railway station, on line of Lehigh & New England Railroad; one mile from school and Lutheran church; one and one-half miles from cheese factory; two miles from creamery. Good roads. Surface is level with some small hills. Good soil. Twelve acres in meadow; 120 acres in timber, pine, oak and chestnut. 151 acres tillable. Fruit: apples, pears, plums and cherries. Adapted to wheat, oats, corn, hay and potatoes. Good barbed wire and wood fences. Good house, 16x24 feet, with addition. Barn, 30x30 feet, with addition. Wagon shed, corn crib, etc. Buildings are watered by wells. Price, \$2,500.00. Terms, one-third cash and balance in payments. There is an electric trolley line, so power and light are handy. Address Joseph Policelli, Roseto, Pa.

No. 225.—Farm of 70 acres, located in Upper Mt. Bethel Township; four miles from Bangor postoffice, R. D. No. 1; two miles from railway station at North Bangor, on line of Lehigh & New England Railroad; one mile from school; one mile from Lutheran and Methodist churches. Altitude, about 1,000 feet. Light sandy soil. Chestnut, oak and pine timber. Twenty acres tillable. About 200 pear trees, apple, cherry and plum. Adapted to strawberries, grapes and fruits generally. Stone fences. Frame house, nine rooms, slate roof. Barn, 16x24 feet, large chicken house, pig pen, etc. Price, \$800.00. Terms, to suit purchaser. This farm would make a great place for a summer resort. Magnificent scenery. Address Louisa Dinsmore, Greensburg, Pa.

No. 226.—Farm of 15 acres, situated in Bushkill Township; five and one-half miles from Nazareth postoffice, R. D. No. 2; two miles from railway station at Ketellen, on line of Lehigh & New England Railroad; near school; one-half mile from church. Good roads. Surface is level. Gravel soil. Whole farm is tillable. Apple, pear, cherry and plum trees. Adapted to general farm crops and potatoes. Wire fences. Stone house, one and one-half stories, five rooms and porches. Good barn, 22x40 feet, and necessary outbuildings. Never-failing well of water at house. Price, \$2,200.00. Terms, \$1,700.00 cash and balance on mortgage. Address W. P. Kahler, 150 S. Whitfield street, Nazareth, Pa.

Northumberland County.

No. 227.—Farm of 160 acres, situated in Point Township; six miles from Northumberland postoffice, R. D. No. 1; one and one-half miles from railway station at Cameron, on line of D. L. & W.

Railroad; one-half mile from school; one and one-half miles from Lutheran church. Good roads. Danville is four miles distant and has a population of 9,000. Surface is a little rolling. Limestone soil. Ten acres in meadow; 90 acres in timber, chestnut, oak and white pine. Seventy acres tillable. Good apple orchard, peaches, plums, pears, cherries and quinces. Adapted to general farm crops. Rail and wire fences. Good house, seven rooms. New barn, 34x50 feet, metal roof. New wagon shed, pig pen, corn crib and chicken house. House is watered by pump and fields by springs. Price, \$2,800.00. Terms, cash. Good quality land. Good for dairying, poultry and trucking. Address William Farnsworth, R. D. No. 1, Northumberland, Pa.

Perry County.

No. 228.—Farm of 17 acres, located in Spring Township; four miles from Landisburg postoffice, R. D. No. 1; railway station at New Bloomfield, on line of Susquehanna River & Western Railroad; one and one-fourth miles from school; one and one-fourth miles from Lutheran, Reformed and Evangelical churches. Good hilly roads. Surface is hilly, but not rough. Altitude about 500 feet. Flint gravel soil. Some black walnut, oak and chestnut timber. Ten acres tillable. 200 apple trees—all bearing. 25 peach and some cherry, pear and quince trees. Adapted to clover, corn, wheat and potatoes. Good wire fences. Stone house, 30x32 feet. Good well and spring at house. Fields are watered by creek. Price, \$650.00. Terms, to suit purchaser. No better location to raise poultry. Fruit excellent in quality and variety. Address M. R. Bower, Landisburg, Pa.

No. 229.—Farm of 365 acres, situated in Saville Township; six miles from Elliottsburg postoffice, R. D. No. 1; five miles from railway station at Loysville, on line of Shermans Valley Railroad; one-fourth mile from school; two miles from Reformed and Lutheran churches. Some hills, but roads are good. Surface is part level and part hilly. Altitude, about 1,100 feet. Slate and creek bottom soil. Sixteen acres in meadow; 250 acres in timber. Seventy acres tillable. 40 apple trees. Adapted to wheat, rye, oats, corn, buckwheat and potatoes. Post and wire fences, fair condition. House, 22x47 feet, in fair condition. Bank barn, 40x70 feet. Chicken house, smoke house, hog pen, etc. Spring at house; trough at barn; fields are watered by springs and brooks. Price, \$4,000.00. Terms, one-half cash and balance to suit purchaser. State road passes the buildings. Timber, if properly handled, should pay three-fourths of price asked for farm. Address W. E. Bailor, Elliottsburg, Pa.

No. 230.—Farm of 105 acres, situated in Carroll Township; two miles from Shermansdale postoffice, R. D. No. 1; six miles from

railway station at New Bloomfield, on line of S. R. & W. Railroad; one mile from school; one mile from Methodist church. Good roads. Surface is rolling and smooth. Good red shale soil. Ten acres in oak, chestnut and pine timber. 95 acres tillable. 100 apple and some plum, cherry and pear trees. Adapted to corn, oats, wheat and grass. Wire fences. House, 24x40 feet, summer house attached. Barn, 60x75 feet, yard covered, condition good. House is watered by well. Price, \$5,500.00. Terms, \$2,000.00 cash and balance to suit purchaser. This is a fine farm. It is under good state of cultivation and everything is in good condition. Address George W. Keller, New Bloomfield, Pa.

No. 231.—Farm of 115 acres, situated in Penn Township; one and one-half miles from Duncannon postoffice R. D. No. 1; one mile from railway station at Juniata Bridge, on line of Pennsylvania Railroad; near school; three-fourths mile from Methodist church. Good roads. Surface is rolling. Red shale soil. Fifteen acres in timber. 100 acres tillable. Usually sufficient fruit for family use. Adapted to general farm crops and dairying. Wire fences. House, 15x28 feet, and L, 15x25 feet. Barn, 45x65 feet. Wagon shed, hog pen, chicken house, etc. House is watered by well; barn and fields by springs. Price, \$8,000.00. Terms, to suit purchaser. Address W. H. Willis, Duncannon, Pa.

No. 232.—Farm of 84 acres, located in Penn Township; two miles from Duncannon postoffice, R. D. No. 3; one-half mile from railway station at Kings Mill, on line of Pennsylvania Railroad; one-half mile from school and Methodist church; one-half mile from milk station. Surface is rolling. Good red shale soil. Some young pine and oak timber. Apple and peach orchard. Adapted to corn, wheat and oats. Wire fences. New eight-room house. Good barn, 36x50 feet. Spring house and other necessary out-buildings. House and barn are watered by spring; fields by running water. Price, \$3,600.00. Terms, to suit purchaser. Address D. B. Troutman, R. D. No. 3, Duncannon, Pa.

Pike County.

No. 233.—Farm of 678 acres, situated in Dingman Township; nine miles from Milford postoffice and the same distance from railway station at Shohola, on line of Erie Railroad; two miles from school and five miles from church. Roads are good but hilly. Part of the surface is level and part hilly. Sandy soil. About 80 acres in meadow; four or five hundred acres in timber, largely white and yellow pine. Adapted to potatoes, corn, oats and buckwheat. Some wire fences. Price, \$3,500.00. Terms, cash. Address Mrs. J. W. Greening, Shohola Falls, Pa.

No. 234.—Farm of 51 acres, located in Palmyra Township; Paupack postoffice is located in the house on this farm. Seven miles from railway station at Hawley, on line of Erie Railroad; one mile from school; one and one-fourth miles from church. Good roads. Hawley has a population of 2,500. Surface is sloping. Altitude, 1,500 feet. Seven acres in meadow; ten acres in timber, hardwood. Sixteen acres tillable. Fruit: 250 peach, 100 apple, 50 plum, 12 cherry, 9 pear, grapes, berries, etc. Adapted to fruit, grain, vegetables, hay, etc. Barbed wire and stone fences. Ten-room house, in good condition. Barn, 30x40 feet. Wagon shed, poultry house and wood house. Fine spring, and water can be forced to buildings by ram or wind mill. Price, \$3,000.00. Terms, \$2,000.00 cash and balance on time. Address E. A. Gumble, Paupack, Pa.

No. 235.—Farm of 80 acres, located in Dingman Township; two and one-half miles from Milford postoffice, R. D. No. 101; nine and one-half miles from railway station at Port Jervis, on line of Erie Railroad. Roads are good but somewhat hilly. Milford is the county seat. Surface is level. Altitude, 1,000 feet. Good mixed soils. Eight acres in meadow; sixty acres in timber, oak, hickory, etc. Eighteen acres tillable. Apples of several varieties. Adapted to general farming. Mostly stone fences, in fair condition. Ten-room house, in fair condition. Barn, about 30x60 feet. Outbuildings. Buildings are watered by well; fields by brook. Price, \$5,500.00. Terms, \$1,500.00 cash and balance on time. All farm implements, etc., are included. Address Wm. G. Thompson, 38 Bleecker street, New York City, N. Y.

No. 236.—Farm of 200 acres, located in Lackawaxen Township; one mile from Kimble postoffice and railway station, on line of Erie Railroad; one and one-half miles from school; four miles from church. Roads are hilly but good. Altitude, 900 feet. Sandy loam soil. 150 acres in timber, mostly oak and pine. 50 acres tillable. Apple, plum, pear and cherry orchard. Adapted to vegetables, corn, etc. Good barbed wire fence. House, 23x34 feet, seven rooms, newly painted and papered. Two barns and two chicken houses. House is watered by well; barn by brook; fields by spring. Price, \$2,700.00. Terms, \$1,200.00 cash and balance on mortgage. Address Joseph Reihl, Kimble, Pa.

No. 237.—Farm of 50 acres, located in Dingsman Township; one mile from Milford postoffice; eight miles from railway station at Port Jervis, N. Y., on the line of Erie Railroad; one mile from school; one mile from Methodist, Catholic, Presbyterian and Episcopal churches; three miles from creamery. Highways are good. Nearest town is Milford, the county seat, population, 850. Soil is shale loam. 12 acres in timber, oak, pine, chestnut; about 30 acres

tillable. Fruits: 6 sour cherry, 4 crab-apple, 25 pear, about 20 or 30 apple. Land is best adapted to corn, rye, alfalfa and hay. Fences, stone, poor condition. House seven-rooms, modern bath, fine cellar, 24x30 feet, in first class condition. Barn, 31x67 feet, cow shed, ice house, corn crib and carpenter shop. House and barn are watered by pipe from spring; fields by pond in center of farm. Price, \$4,000.00. Terms, \$1,000.00 cash, balance to suit purchaser. An ideal farm for chickens, pigeons, bees, ducks and geese. Five minutes walk to the Delaware River. Fishing, boating, sailing and bathing. Trout stream nearby. Address J. S. Owner, Milford, Pa.

Potter County.

No. 238.—Farm of 130 acres, situated in Hebron Township; nine miles from Coudersport postoffice, R. D. No. 2; two miles from railway station at Coneville, on line of New York & Pennsylvania Railroad; one mile from school and church; one mile from cheese factory; two miles from condensing plant. Good state and macadamized roads. Coudersport, the county seat, is nine miles distant and has a population of over 3,000. Some of the surface is hilly and some lies very well. Good red shale soil. Twelve acres in meadow; sixteen acres in timber, beech, maple and basswood. About twelve acres tillable and balance of land is in pasture. Adapted to hay, oats, potatoes and buckwheat. Barbed wire fences, fair condition. New house, 18x28 feet with wing, 20x24 feet. Small barn and cow stable. Enough hemlock on the farm to erect all necessary buildings. Running water at house from never-failing spring. Price, \$5,000.00. Terms, \$3,000.00 cash and balance on easy terms. There are four producing gas wells on this farm from which revenue to the amount of \$400.00 is received annually. House is plumbed for gas. Address George Boseley, Coudersport, Pa.

Schuylkill County.

No. 239.—Farm of 75 acres, located in West Brunswick Township; two miles from Orwigsburg postoffice, R. D. No. 1; railway station at Orwigsburg, on line of Lehigh Valley Railroad; school on farm; two miles to church, four different denominations. Good roads. Surface is mostly level. Red gravel soil. Whole farm is tillable. 1,400 apple, pear and peach trees. Adapted to fruit and cereals. House is in fair condition. Barn and two sheds, in excellent condition, painted, tracked and rodded. Water is piped to house and barn from spring near by. Fields are watered by springs and creek. Price, \$7,000.00. Address J. E. Heine, Orwigsburg, Pa.

No. 240.—Farm of 252 acres, situated in Washington Township; two miles from Pine Grove postoffice, R. D. No. 2; one mile from railway station at Stanhope, on line of Pennsylvania Railroad; one

mile from school and church. Good roads. Part of this farm is level and part hilly. Sand and gravel soil. 50 acres in meadow; 20 acres in oak and chestnut timber; 180 acres tillable. Fruit: 75 apple, 12 plum, 30 peach, 25 pear and 100 grapes. Adapted to all kinds of farm crops and especially hay. New house, two story, 30x32 feet, and kitchen. Barn, 40x80 feet. New wagon shed, pig sty and hen house. Well at house. Running water at barn and in the fields. Price, \$8,000.00. Terms, one-half cash and balance on mortgage at five per cent. This is worth looking into. Address J. D. Rarick, Pine Grove, Pa.

No. 241.—Farm of 714 acres, located in East Union Township; one mile from Girard Manor postoffice; railway station at Girard Manor, on line of P. & R. Railway; three-fourths mile from school; three miles from church. Roads are hilly but in fair condition. Surface is rolling. Red shale soil. About 100 acres in meadow; 75 acres in timber, oak, chestnut and pine. 250 acres tillable. 350 apple, 50 peach and 50 pear trees. Adapted to hay, grain, potatoes, truck and fruit. Eleven-room house, fair condition. Barn, 30x150 feet. Price, \$60.00 per acre. Terms, to suit purchaser. Good market for all kinds of produce. Address G. C. Davison, R. D. No. 2, Ringtown, Pa.

Somerset County.

No. 242.—Farm of 600 acres, situated in Jefferson Township; three miles from Bakersville postoffice; five miles from railway station at Allenvale, on line of P. W. & S. Railroad; one mile from school and one mile from Brethren church. Good roads. Somerset, the county seat, is eleven miles away and has a population of 3,000. Surface is rolling. Loam soil. 40 acres in meadow; 540 acres in timber, mixed and of good quality. 40 acres tillable. Fruit: forty or fifty trees of various kinds. Adapted to wheat, oats, rye and buckwheat. Rail and wire fences. House, 23x34 feet, in good condition. Barn, 35x65 feet, practically new and in good condition. Spring house and chicken house. Buildings and fields are watered by springs. Price, \$30,000.00. Terms, cash. Timber estimated to cut 6,000,000 feet. Entire tract is underlaid with coal. Address M. M. Shaulis, R. D. No. 2, Boswell, Pa.

No. 243.—Farm of 66 acres, situated in Lower Turkeyfoot Township; one mile from Confluence postoffice, R. D. No. 1; railway station at Confluence, on line of B. & O. Railroad; one mile from school and one mile from church. Good roads. Hillside surface. Walnut soil. 16 acres in meadow and 20 acres in woodland. 46 acres tillable. Apple, cherry and pear orchard. Adapted to corn, oats, wheat and potatoes. Barbed wire fences, fair condition. Good eight room

house. Barn, 39x42 feet. Horse stable, chicken house, hog house and other necessary outbuildings. House and fields are watered by springs. Price, \$3,200.00. Terms, \$1,800.00 cash and balance to suit purchaser. The mineral rights go with the farm. Address J. W. Wysel, R. D. No. 1, Confluence, Pa.

Sullivan County.

No. 244.—Farm of 160 acres, situated in Fox Township; four miles from Wheelerville postoffice, R. D. No. 1; two miles from Masten and Ellenton railway stations, on line of Susquehanna & New York Railroad; three-fourths mile from school; two miles from church. Part of the roads are hilly but in good condition. 25 acres in meadow; 25 acres in timber, beech, birch, maple, etc. Most of the meadow land is tillable. Apple, peach, cherry and pear orchard. Well adapted to fruit and livestock. Mostly wire fences. Large eleven-room house, built five years ago. Barn is in fair condition. Pig pen, poultry house and ice house. Pump in kitchen; running water at the barn; running water in the fields. Price, \$2,000.00. Terms, \$500.00 cash and balance in payments. Address Mrs. Z. T. Kilmer, R. D. No. 2, Canton, Pa.

Susquehanna County.

No. 245.—Farm of 143 acres, situated in Silver Lake Township; seven miles from railway station at Montrose, on line of D. L. & W. Railroad; one mile from school; two and one-half miles from church; three miles from creamery. 50 acres in timber, hemlock and hardwood. 90 acres tillable. Small apple orchard. Adapted to general farm crops. Wire fences, in good condition. Two story house, eight-rooms, in good condition. Basement barn, 40x50 feet. Horse barn and necessary out-buildings. Buildings are watered by springs; fields by springs and creek. Price, \$3,000.00. Terms, cash. There is \$1,000.00 worth of timber on this farm. Livestock and implements may be bought at a reasonable price. Address John W. McNerney, Montrose, Pa.

No. 246.—Farm of 50 acres, situated in Jackson Township; five miles from Susquehanna postoffice, R. D. No. 1; railway station at Susquehanna is on line of Erie Railroad; one-fourth mile from school and Baptist church; four miles from cheese factory; five miles from creamery. Good roads. Surface is level. Lovely lake right in front of the house. Pine, hemlock, beech and maple timber. Nice orchard and good quality of apples and plums. Adapted to potatoes, corn, buckwheat, oats and rye. Barbed wire and rail fences. Good ten-room house, needs new roof. Good large barn. Wagon shed, etc.

House is watered by well; fields by springs. Price, \$1,000.00. Terms, to be arranged. Mrs. Jennette Knapp, R. D. No. 1, Susquehanna, Pa.

No. 247.—Farm of 98 acres, located in Harmony Township; three miles from Susquehanna postoffice, R. D. No. 3; railway station at Susquehanna is on line of Erie Railroad; one-half mile from school; two miles from church; three miles from creamery and milk station. Good state road. Surface is generally rolling. Altitude, about 1,500 feet. Clay soil. 20 acres in meadow; ten acres in timber. 60 acres tillable. Twenty apple, ten plum and some young pear trees. Adapted to grass, oats, buckwheat, corn and potatoes. Mostly woven wire fences. Nine-room house, in good condition. Barn, 30x42 feet, with basement, in good repair. Running water at house from spring. Price, \$3,000.00. Terms, one-half cash and balance on time. Address A. L. Langford, Susquehanna, Pa.

No. 248.—Farm of 110 acres, situated in Auburn Township; one mile from West Auburn postoffice; six miles from railway station at Skinners Eddy, on line of Lehigh Valley Railroad; one mile from school and Methodist church; one mile from creamery. Good macadam roads. Laceyville is seven miles distant, and has a population of 2,000. Part of the surface is rolling and part level. Altitude, 900 feet. Good quality loam soil. 40 acres in meadow; 12 acres in timber, good hemlock and ash. 75 acres tillable. 50 apple trees. Adapted to hay, potatoes and grain. Wire fences, fair condition. Large ten-room house, in good condition. Good horse and cow barns. Granary and other outbuildings. Spring at house. Price, \$3,000.00. Terms, \$1,000.00 cash and balance on mortgage. Fine location. Address Mrs. Alice Cogswell, Mansfield, Pa.

No. 249.—Farm of 230 acres, situated in Rush Township; one and one-half miles from Rushville postoffice, R. D. No. 2; fourteen miles from railway station at Wyalusing, on line of Lehigh Valley Railroad; school on farm, one and one-fourth miles from Presbyterian church; one and one-fourth miles from creamery and cheese factory. Dirt roads. Part of the surface is hilly and part level. Loam soil. About 100 acres in meadow; 130 acres in timber, pine, hemlock and chestnut. 100 acres tillable. 75 apple trees. Adapted to corn, oats, buckwheat and potatoes. Mostly wire fences, in good condition. Good house, 45x45 feet. Barn, 40x48 feet, with additions. Nearly new log house, hen house and wood house. Buildings are watered by springs and fields by creek. Price, \$2,500.00. Terms, part cash and balance in payments. Address D. A. Shadduck, Cortland, New York.

No. 250.—Farm of 150 acres, situated in Jessup Township; one and one-half miles from Birchardville postoffice, R. D. No. 1; seven and one-half miles from railway station at Montrose, on line of D. L.

& W. and Lehigh Valley Railroads; one mile from school; one and one-half miles from Baptist church; one and one-half miles from creamery. Montrose is the county seat and has a population of 2,500. Good roads. Surface is rolling. 50 acres in meadow; 10 acres in timber, hemlock and hardwood. 125 acres tillable. Some apple trees. Adapted to corn, oats, wheat, rye, buckwheat and hay. Mostly barbed wire fences, in fair condition. Ten-room house, fair condition. Barn, 40x50 feet with basement. Running water at house and barn. Fields are watered by springs and creek. Price, \$2,500.00. Terms, cash. Address Margaret Hall Estate, Birchardville, Pa.

No. 251.—Farm of 119 acres, situated in Lenox Township; five miles from Hop Bottom postoffice, R. D. No. 2; seven miles from railway station at Nicholson, on line of D. L. & W. Railroad; one-half mile from school; two miles from Methodist church; five miles from creamery and cheese factory. Good roads, Valley farm with hills on the sides. Very fertile sandy loam soil. 20 acres in meadow; 45 acres in timber, young chestnut, basswood, maple and ash. About 40 acres tillable. Apple orchard, good varieties. Wire fences, not in good condition. Nine-room house, good condition. Barn, 30x30 feet. Good spring near the house. Price, \$1,300.00. Terms, cash. Address Floyd Carpenter, South Gibson, Pa.

No. 252.—Farm of 97 acres, situated in Auburn Township; nine miles from Meshoppen postoffice, R. D. No. 3; four miles from railway station at Springville, on line of Lehigh Valley Railroad; one mile from school; one mile from Methodist, Catholic and Baptist churches; one mile from creamery. Roads are hilly but generally good. Part of the surface is hilly, part rolling, part level. Altitude, 1,350 feet. Shale soil. 60 acres in meadow; 10 acres in timber, ash, chestnut, maple, beech and basswood. Whole farm is tillable if cleared. Apple orchard. Adapted to corn, oats, rye, hay and fruit. Woven wire, barbed wire, rail and stone wall fences. Ten-room house, heated by furnace. Cow barn, 30x40 feet, cement floor. Horse barn, ice house, wood shed, wagon shed, granary, etc. House is watered by well; barn by running water; fields, by spring. Price, \$3,000.00. Terms, \$1,100.00 cash and balance in payments. Telephone and rural mail delivery. This sale includes sixteen shares of stock in a good co-operative creamery. Address I. S. Cogswell, 413 Delaware street, Forest City, Pa.

No. 253.—Farm of 140 acres, situated in Friendsville Borough; one-half mile from Friendsville postoffice; one-half mile from school and Catholic church. Good roads. Part of the surface is rolling and part level. Altitude, 1,700 feet. Clay loam soil. 100 acres in meadow and pasture; 40 acres in timber, beech, maple and hemlock. 100 acres tillable. Apple orchard of choice fruit. Adapted to corn,

potatoes, oats, buckwheat. Woven wire and barbed wire fences. One and one-half story house, 26x36 feet, ten rooms. Basement barn, 30x40 feet, with stables attached. House is watered by well; barn and fields by good springs. Price, \$2,400.00. Terms, one-third cash and the balance in payments. Address Lester Turrell, Birchardville, Pa.

No. 254.—Farm of 103 acres situated in Ararat Township; five miles from Thompson postoffice, R. D. No. 1; one mile from railway station at Ararat, on line of Erie Railroad; one mile from school; three-fourths mile from Presbyterian and Methodist churches; one mile from milk station; two and one-half miles from creamery and cheese factory. Good level road. Surface slopes gradually to the west. Good soil. 40 acres in meadow; 30 acres in timber, maple, beech, ash, etc. 33 acres in pasture and 50 acres tillable. Fruit: apple, pear and cherry. Adapted to oats, potatoes, corn, hay and clover. Wire and stone wall fences, in fair condition. Large house, ten rooms, good condition. Good barn, 40x50 feet. Corn crib, spring house, hog house. Buildings and fields are watered by springs. Price, \$2,500.00. Terms, \$1,000.00 cash and balance in payments. The timber on this farm must remain standing until the farm is half paid for. Address Mrs. J. A. Tinklepaugh, R. D. No. 1, Thompson, Pa.

No. 255.—Farm of 137 acres, located in Ararat Township; five miles from Thompson postoffice, R. D. No. 1; one and one-fourth miles from railway station at Ararat, on line of Erie Railroad; one mile from school and church; one and one-fourth miles from milk station; two and one-half miles from creamery and cheese factory. Good level roads. 60 acres in meadow; 15 acres in timber, chestnut, maple and beech; 75 acres tillable. 75 apple trees, different varieties. Adapted to oats, corn, potatoes and hay. Stone wall and wire fences, in fair condition. Good ten-room house. Good barn, 40x50 feet. Necessary out-buildings. House is watered by well; barn by spring; fields by springs and running stream. Price, \$3,500.00. Terms, \$1,000.00 cash and balance in payments. The house and barn are nearly new. There is a fine flag stone quarry on this farm. Address Mrs. J. A. Tinklepaugh, R. D. No. 1, Thompson, Pa.

Tioga County.

No. 256.—Farm of 75 acres, situated in Duncan Township; eight miles from Wellsboro postoffice, R. D. No. 5; two miles from railway station at Brownlee, on line of New York Central Railroad; two miles from church and school. Roads are hilly but good. Sandy and clay soil. Thirty acres in meadow; 45 acres tillable and balance in pasture. Fruit: 50 apple and some other trees. Adapted to oats,

corn, buckwheat and potatoes. Wire fences and in good condition. Nine-room house with wide porch. Barn in good condition. Large shed. Buildings are watered by wells; fields by spring. Price, \$2,500.00. Terms, cash. Address Erick Johnson, R. D. No. 5, Wellsboro, Pa.

No. 257.—Farm of 140 acres, situated in Westfield Township; three miles from Westfield postoffice, R. D. No. 3; one and one-half miles from Potter Brook railway station, on line of N. Y. C. & H. R. Railroad; one and one-half miles from school and church; three miles from milk condensing plant. Tillable land is quite level and balance is hilly. Altitude, about 2,000. Red loam soil. 20 acres in meadow; 20 acres in timber, maple, basswood, beech and chestnut. 50 acres tillable and balance is in pasture. Orchard consisting of apple, cherry, pear and plum trees. Adapted to hay, oats, corn, potatoes, and buckwheat. Wire and board fences. New eight-room house. Barn, 42x50 feet, with basement. New hog house and hen house. Water in kitchen and trough at barn. Fields are watered by springs. Price, \$2,000.00. Terms, one-half cash and balance in payments. This is a good general purpose farm and must be seen to be appreciated. Address J. E. Watkins, Westfield, Pa.

No. 258.—Farm of 225 acres, situated in Richmond Township; four and one-half miles from Mansfield postoffice, R. D. No. 5; railway station at Mansfield is on the line of Erie Railroad; children from this section are transported to Mansfield State Normal school; one and one-half miles to church; one and one-half miles to creamery. Roads are hilly but good. Red shale soil. 75 acres in meadow; 15 acres in second growth timber. Whole farm can be tilled if cleared. Small apple orchard. Adapted to corn, oats, hay and buckwheat. Rail and wire fences. House, 28x42 feet, in fair condition. Barn, two sheds, granary, etc. House is watered by well; barn by spring; fields by springs. Price, \$9,000.00. Terms, one-half cash and balance to suit purchaser. Address C. F. Walters, Mansfield, Pa.

No. 259.—Farm of 65 acres, located in Charleston Township; five miles from Wellsboro, R. D. No. 9; railway station at Wellsboro in on line of N. Y. C. R. R.; one-half mile from school; one mile from Congregational church; five miles from milk condensing plant. Good roads. Wellsboro is the county seat and has a population of 3,500. Very fertile soil. 45 acres in meadow; 10 acres in timber; 55 acres tillable. 10 apple and 12 pear trees. Adapted to farm crops generally. Wire and rail fences, in good condition. House, 12x20 feet, with addition, in fair condition. Barn, 18x30 feet, in fair condition. Buildings are watered by well and fields by spring. Price, \$2,500.00. Terms, cash. Address Burr J. Bowen, R. D. No. 5, Wellsboro, Pa.

Union County.

No. 260.—Farm of 160 acres, located in Hartley Township; two and one-half miles from Weikert postoffice; one mile from railway station at Cherry Run, on line of L. & T. Railroad; two miles from school and church. Very good highways. Farm has good drainage but is comparatively level. Sandy loam and slate soil. 100 acres in pine, oak and chestnut timber. Sixty acres tillable. Some apple and peach trees. Good house, two story, 24x30 feet. Necessary out-buildings. House is watered by pump and barn by run. Price, \$3,500.00. Terms, cash. Address Wm. Johnson, Weikert, Pa.

No. 261.—Farm of 121 acres, situated in Limestone Township; three miles from Mifflinburg postoffice, R. D. No. 1; railway station at Mifflinburg is on line of P. R. R.; one-third mile to school; one-eighth mile to church; one and one-half miles to milk station; two and three-fourths miles from creamery and condensery. Good roads. Surface is slightly rolling. Sandy surface with clay subsoil. Eight acres in timber, cedar, white pine, chestnut and rock oak. 111 acres tillable. Orchard of selected varieties and choice fruit. Adapted to corn, oats, wheat, potatoes and especially hay. Wire and post fences, good. Eight-room frame house, in good condition. Barn, 35x70 feet. Pig pen, corn crib, etc. Drilled well at house; brook in corral; fields are watered by streams. Price, \$4,000.00. Terms, \$1,000.00 cash and balance on mortgage. Near store, mill and broom factory. Good neighbors. Address Clark B. Mench, Mifflinburg, Pa.

No. 262.—Farm of 106 acres, situated in Buffalo Township; three and one-half miles from Mifflinburg postoffice, R. D. No. 1; two miles from railway station at Vicksburg, on line of Pennsylvania Railroad; one-half mile to school; one-fourth mile to church; two miles from creamery, cheese factory and milk station. Roads are solid. Lewisburg, the county seat, is five miles distant and has a population of 5,000. Surface is rolling. Limestone and gravel soil. 15 acres in timber, rock oak, yellow pine and chestnut. About 90 acres tillable. 60 apple and 60 peach trees. Adapted to wheat, rye, oats, corn and potatoes. Fences are generally good. Eight room house with new annex. New barn and large straw shed. An up-to-date dairy barn. Water is piped from spring to house and barn. Water in all the fields, except two. Price, \$6,000.00. Terms, cash. This farm is worth more. The house and barn would cost \$4,000.00. The timber is worth \$2,000.00. Address Harry S. Frock, R. D. No. 1, Lewisburg, Pa.

Venango County.

No. 263.—Farm of 85 acres, situated in Plum Township; three miles from Diamond postoffice, R. D. No. 1; pupils are hauled to school; one and one-half miles to Presbyterian, Methodist and Baptist churches; four miles to cheese factory. Improved state roads. Surface is slightly rolling. Altitude, about 1,300 feet. Sandy clay soil. 20 acres in meadow; 10 acres in timber, oak, chestnut, maple, etc. 75 acres tillable. Orchard. Adapted to cereals, potatoes, hay, etc. One-half of the farm is fenced with good rail fence. Two story house, 16x24 feet, with addition, in good condition. Barn 40x52 feet, in good condition. There is a spring from which the water can be conducted through the buildings. At the present time the buildings are watered by wells and the fields by springs. Oil and gas rights are reserved. Price, \$3,000.00. Terms, cash. Address Emma E. Weber, Cooperstown, Pa.

No. 264.—Farm of 86 acres, located in Pinegrove Township; at Venus postoffice; three and one-half miles from railway station at Billings, on line of F. & C. Railroad; one-half mile from school; two miles from church. Dirt roads are somewhat hilly but in fairly good condition. Surface is generally rolling. Clay soil. 60 acres in meadow; 26 acres in timber, oak, hickory, chestnut, etc. 70 acres tillable. 30 apple trees. Adapted to oats, corn, hay and buckwheat. House, 16x26 feet, needs repairing. Spring at the house. Spring run in the fields. Price, \$900.00. Terms, \$250.00 cash and balance in payments. Address Joseph E. Kenerline, President, Pa.

No. 265.—Farm of 142 acres, situated in Jackson Township; two miles from Cooperstown postoffice; four miles from Sugar Creek railway station, on line of Erie Railroad; one-fourth mile from school; one-eighth mile from Presbyterian church. State highway through farm. Franklin, the county seat, is seven miles away and has a population of 11,000. About three-fourths of this farm is level and the balance is hilly. Altitude, 1,200 feet. Clay and sandy loam soil. 20 acres in meadow; 40 acres in timber, oak and sugar maple. 100 acres tillable. 20 apple trees. Adapted to grain and hay. Two story house with cellar, 16x28 feet, kitchen. Bank barn, 50x60 feet. Carriage house, spring house, corn crib, etc. Buildings and fields are watered by springs and creek. Price, \$4,000.00. Terms, cash. This would make a first class dairy farm. Address T. C. Beightol, Sr., Administrator, R. D. No. 2, Utica, Pa.

No. 266.—Farm of 11½ acres, located in Richland Township; one-fourth mile from Emlenton postoffice, R. D. No. 2; railway station at Emlenton is on line of P. R. R.; one-half mile from school; one mile from Reformed, Presbyterian, Lutheran, Methodist and Catholic churches; five miles from creamery. Roads are hilly but in fairly

good condition. Surface is level. Altitude, 1,700 feet. Soil is loam with clay subsoil. 7 acres in meadow; one acre in young oak and maple timber. $8\frac{1}{2}$ acres tillable. Orchard. Adapted to farm crops generally. Some new fences. Six-room house, 12x28 feet, addition, practically new. Barn, 12x28 feet, new. Poultry house, etc. Buildings are watered by wells. Price, \$2,300.00. Terms, cash. Address Alma Edinger, 19 S. Park street, Franklin, Pa.

No. 267.—Farm of 171 acres, situated in Irwin Township; six miles from Raymilton postoffice, R. D. No. 1; railway station at Raymilton is on line of L. S. & M. S. Railroad; one mile from school; two miles from Methodist and Presbyterian churches. Surface is rolling. Altitude, 1,500 feet. Soil is sandy loam and clay. 100 acres in meadow; 56 acres in pasture, 15 acres in timber, oak, chestnut and hickory. 100 acres tillable. Fruit consisting of cherries, plums, apples, pears and peaches. Adapted to wheat, oats, buckwheat and corn. Rail fences, in fairly good condition. Brick house, seven rooms and two halls, in good condition. Bank barn, 36x56 feet. Spring and well at house. Running water in fields. Price, \$7,000.00. Terms, one-half cash and balance to suit purchaser. This farm is underlaid with two veins of coal. It is a fine grazing farm. Splendid view from this farm. Location is desirable. Address John C. Henderson, Raymilton, Pa.

No. 268.—Farm of 57 acres, situated in Pinegrove Township; three and one-half miles from Venus postoffice, R. D. No. 1; seven miles from railway station at President, on line of Penna. Railroad; three-fourths mile from school; one-fourth mile from Church of God; six miles from creamery. Roads are somewhat hilly but good. Surface is gently rolling. Altitude, about 1,000 feet. Sandy loam soil. 21 acres in meadow; 12 acres in timber. About 41 acres tillable. 10 apple and 6 cherry trees. Adapted to hay, corn, potatoes and buckwheat. Wire fences, in good condition. New house, 24x32 feet, with two porches. Barn, 42x54 feet. Pig pen, chicken coop, spring house and corn crib, all new. House is watered by spring; barn by spring and brook and fields by spring and brook. Price, \$2,500.00. Terms, part cash and balance to suit purchaser. Free gas for house. Oil and gas rights reserved. Address Wesley M. Schwab, Venus, Pa.

No. 269.—Farm of 106 acres, situated in Oil Creek Township; five miles from Titusville postoffice; three miles from East Titusville railway station, on line of Allegheny Valley Railroad; near school and church. This farm is on the public road leading from Titusville to Oil City. Part of the surface is level and part rolling. Sandy and clay soil. 50 acres in meadow; 40 acres in pasture. Orchard. Adapted to grain of all kinds. Rail fences in fair condition. Eight-

room house, in fair condition. Barn, 30x44 feet. Spring house, hen house and pig pen. Good spring at house. Water is piped from spring to barn. Price, \$4,000.00. Terms, one-half cash and balance in payments. Farm is producing some oil. Address Ida Bailey, 234 East Central Ave., Titusville, Pa.

No. 270.—Tract of 460 acres, located in Victory Township; one mile from Polk postoffice and railway station, on line of Lake Shore Railroad. Franklin, the county seat, is six miles distant and has a population of 10,000. Altitude, 1,500 feet. This is an unseated tract of land. Timber was cut several years ago. About 200 acres are flat and the balance of the tract is hillside. One-half interest in the oil and mineral rights is reserved. Price, \$5.00 per acre. Terms, easy. Will exchange for city property. Address O. K. Burns, R. D., Edinburg, Pa.

Warren County.

No. 271.—Farm of 80 acres, located in Elk Township; seven miles from Russell postoffice, R. D. No. 1; Russell is on line of N. Y. C. Railroad; three-fourths mile from school; one mile from church; two miles from creamery. Good roads except some hills. Warren, the county seat, is eleven miles distant. Surface is level. Sandy loam soil. 30 acres in meadow; 50 acres in timber, good second growth hardwood; 30 acres tillable. Orchard. Adapted to corn, potatoes and buckwheat. Some wire and rail fences, not in very good condition. Fourteen-room house, needs some repairs. Large barn and shed. House is watered by well and barn by spring. Price, \$1,050.00. Terms, \$600.00 cash and balance on mortgage. The timber is a consideration in connection with this farm. Address Otto Sandberg, Russell, Pa.

No. 272.—Farm of 220 acres, situated in Freehold Township; three miles from Sugar Grove postoffice, R. D. No. 1; four miles from railway station at Niobe, N. Y., on line of Erie Railroad; three-fourths mile from creamery. Good roads. Surface is rolling. Altitude, 1,500 feet. Loam soil. 60 acres in meadow; 30 acres in second growth timber; 100 acres tillable. Fruit: 200 fruit trees, mostly winter apples. Adapted to hay, oats, corn and buckwheat. Rail and wire fences, in good condition. Fourteen-room house, good condition, cellar under whole house. Basement barn, 36x54 feet. Built in 1908. Buildings are watered by drilled wells and fields by springs. Price, \$5,000.00. Terms, one-half cash and balance in easy payments. This farm is offered at a bargain price. Address C. C. Cooper, Sugar Grove, Pa.

No. 273.—Farm of 68½ acres, situated in Triumph Township; five miles from Grand Valley postoffice, R. D. No. 2; Grand Valley is on the line of the Dunkirk and Allegheny Valley Railroad; one mile

from school; one mile from United Brethren and Lutheran churches; one-half mile from cheese factory. Good dirt roads. Surface is gently sloping to the southeast. Clay bottom soil, in fair state of cultivation. 15 acres in meadow; 28 acres in pasture and woodland. 40 acres tillable. About 40 apple and some cherry, pear and peach trees. Adapted to wheat, oats, corn and potatoes. Rail and wire fences, good condition. Five-room house, 16x24 feet, fair condition. Bank barn, 30x76 feet, condition fair. Hog pen, chicken house, cement cave, etc. House and barn are watered by never-failing well; fields by springs in pasture. Price, \$1,000.00. Terms, \$500.00 down and balance on time. Excellent neighborhood. Address George Hineman, R. D. No. 2, Grand Valley, Pa.

No. 274.—Farm of 405 acres, situated in Spring Creek Township; three miles from Garland postoffice and railway station, on line of P. & E. Railroad; three miles from school and church. Good roads. Surface is rolling. 60 acres in meadow; 245 acres in timber, pine, hemlock and hardwood; 100 acres in pasture. Adapted to oats, corn, wheat, buckwheat and potatoes. Wire fences, in good condition. Nine-room house. Basement for stable, size, 35x60 feet. House is watered by spring; barn and fields by stream. Price, \$5,000.00. The timber on this farm will pay for it. Address C. S. Morris, Garland, Pa.

No. 275.—Farm of 93 acres, situated in Limestone Township; five and one-half miles from Tidioute postoffice, R. D. No. 1; Tidioute is on the line of the Pennsylvania Railroad; one-half mile from school and church. Some of the roads are hilly and some quite good. Surface is rolling. Altitude is about 1,600 feet. Good clay soil. 25 acres in meadow; 40 acres in timber, largely chestnut. About 50 acres tillable. Fruit: 40 apple and some plum, cherry, pear and peach trees. Adapted to hay, oats, buckwheat, wheat, corn and potatoes. Some rail and some wire fences. House is in fair condition. This farm is watered by springs. Price, \$1,500.00. Terms, cash. Gas well on farm. Address J. W. Anderson, R. D. No. 2, Grand Valley, Pa.

No. 276.—Farm of 360 acres, located in Pittsfield Township; one-fourth mile from Garland postoffice and railway station, on line of P. & E. Railroad; one-fourth mile from school; one-half mile from church; one-half miles from creamery. Good roads. Surface is mostly level. 60 acres in meadow; about 100 acres in timber, hemlock, pine and hardwood; 260 acres tillable. Orchard. Adapted to corn, oats, wheat, potatoes, etc. Mostly wire fences, in good condition. Two houses. Two good barns, two silos, corn crib, hen house and pig pen. House and barn are watered by wells; fields by creek and springs. Price, \$10,000.00. Terms, one-half down and time on

balance. Cow barn with cement floor will house fifty head. Buildings were all painted in 1914. Address C. S. Morris, Garland, Pa.

No. 277.—Farm of 219 acres, situated in Deerfield Township; three miles from Tidioute postoffice, R. D. No. 2.; Tidioute is on the line of the Pennsylvania Railroad; one mile from school; two miles from church. Surface is part rolling and part level. Good soil. 40 acres in meadow; 50 acres in timber, hardwood. 100 acres tillable. Fruit: 200 apple and some plum, pear and cherry trees. Adapted to corn, oats, hay, buckwheat and wheat. Wire and rail fences. Seven-room house, good condition. Barn, 36x48 feet, with underground stable. Hen house, hog house, etc. Spring at the house, trough at the barn and springs in the fields. Price, \$3,500.00. Terms, \$1,500.00 down and balance to suit purchaser. We will sell stock and machinery with farm. Address Mrs. Florence Lynch, R. D. No. 2, Tidioute, Pa.

No. 278.—Farm of 75 acres, situated in Pine Grove Township; two miles from Russell postoffice, R. D. No. 2; Russell is on the line of the D. A. V. Railroad; two miles from church, creamery and condensery. Roads are good but a little hilly. Surface is nearly level. Good heavy loam soil. 55 acres tillable. Enough timber for repairs and fuel. Young apple orchard and mixed fruits. Adapted to corn, oats, potatoes, wheat and rye. Rail and wire fences, in good condition. Ten-room house, good condition. Cow and hay barn, 40x60 feet. Horse barn, 40x50 feet, underground stables. House is watered by cistern and well; barn by well; fields by spring. Price, \$3,200.00. Terms, part cash or all cash. Well located to ship milk to Warren and Jamestown. Address Benj. F. Hanna, R. D. No. 2, Russell, Pa.

No. 279.—Farm of 100 acres, located in Watson Township; seven miles from Tidioute postoffice, R. D. No. 1; two and three-fourths miles from railway station at Cobham, on line of Pennsylvania Railroad; near school; two and one-half miles from church. Surface is rolling. Altitude, 1,800 feet. Clay loam soil. 35 acres in meadow; 30 acres in timber, chestnut, oak, maple, hemlock, etc. 45 acres tillable. Orchard of choice fruit. Adapted to corn, oats, hay, potatoes and buckwheat. Wire and rail fences, condition good. Ten-room house, two story, plastered, in good condition. Barn, 40x64 feet, with basement. Carriage and tool house, corn crib, hen house and hog pen. Good well at the door. Spring at the barn. Fields are watered by springs and spring run. Price, \$3,100.00. Terms, \$2,000.00 down and time on the balance. Farm implements, wagons, and small tools go with farm at above price. This is not a run down farm and the price is very low. Address A. Gillis, R. D. No. 1, Tidioute, Pa.

No. 280.—Farm of 100 acres, situated in Limestone Township; four miles from Tidioute postoffice and railway station, on line of Penna. Railroad; one mile from school and church. Clay and sandy soil. 50 acres in meadow; 50 acres in timber, ash, chestnut, etc. 50 acres tillable. Adapted to wheat, rye, oats, buckwheat and potatoes. No buildings. Farm is watered by springs. Price, \$1,000.00. Terms, cash. Address John Siggins, Tidioute, Pa.

No. 281.—Farm of 160 acres, situated in Triumph Township; four miles from Tidioute postoffice and railway station, on line of Penna. Railroad; one mile from school and church. Clay and sandy soil. 100 acres in timber, pine, hemlock, oak and chestnut. Greater part of this tract could be tilled. 50 fruit trees. Adapted to wheat, rye, oats, buckwheat and potatoes. Small house and barn. Watered by springs. Price, \$1,600.00. Terms to suit purchaser. Address John Siggins, Tidioute, Pa.

No. 282.—Farm of 105 acres, situated in Deerfield Township; three miles from Tidioute postoffice and railway station, on line of Penna. Railroad; one mile from school and two miles from church. Roads are mostly good. Clay and gravel soil. 50 acres in timber, principally oak and chestnut. Greater part of this farm can be cultivate. Adapted to wheat, oats and buckwheat. Farm is watered by springs. Price, \$1,000.00. Terms, one-half cash and balance on time. Or, will sell surface for \$500.00 and reserve mineral rights. Address John Siggins, Tidioute, Pa.

Washington County.

No. 283.—Farm of 124 acres, situated in Hopewell Township; two and one-half miles from Rea postoffice, R. D. No. 1; Rea is on line of Wabash Railroad; one-fourth mile from school; one-half mile from church; two and one-half miles from milk station. Surface is rolling but easily farmed. Sandy and limestone soil. 30 acres in meadow; 24 acres in timber, largely white oak and sugar maple. 100 acres tillable. 72 apple, 25 peach, 12 plum and 6 quince trees. Adapted to wheat, corn, oats and hay. Wire and rail fences. House has six rooms and kitchen, good condition. Barn, 30x60 feet. House is watered by cistern and fields by springs. Price, \$65.00 per acre. Terms, reasonable. This is a good productive farm. Buildings are located on state road. Rural mail delivery. Address Mrs. W. L. McCreary, R. D. No. 1, Rea, Pa.

No. 284.—Farm of 200 acres, situated in Independence Township; five miles from railway station at Avella, on line of Wabash Railroad; school on farm; two and one-half miles to church. Ridge road with some small hills. Surface is rolling. Altitude, about 1,250 feet. Limestone and freestone soil. 15 acres in meadow; 175 acres till-

able. Some apple, plum, peach and pear trees. Adapted to corn, wheat and oats. Picket, rail and wire fences. No house. Barn, 30x60 feet, fair condition. Granary, wagon shed, etc. House site is watered by well and barn by spring. Price, \$25.00 per acre. Terms, one-third cash and balance on mortgage. This farm is underlaid with Pittsburgh vein coal and coal rights are reserved at price named. Address D. A. Scott, West Middletown, Pa.

No. 285.—Farm of 124 acres, located in Jefferson Township; three miles from Hanlin Station postoffice, R. D. No. 1; one mile from railway station at Colliers, W. Va., on line of P. C. C. & St. L. Railroad; one mile from school; two miles from church; one mile from milk station. Roads are hilly. Surface is part rolling and part hilly. Altitude, about 1,100 feet. Limestone and sandy loam soil. 25 acres in timber, locust, wild cherry, maple, birch and poplar. 100 acres tillable. Some fruit trees. Adapted to corn, potatoes and farm crops generally. Some wire fences. Price, \$3,000.00. Terms, one-third cash and balance in payments. This farm is underlaid with Pittsburgh vein and Freeport vein coal. Address Mrs. Emma F. Noah, R. D. No. 1, Hanlin Station, Pa.

No. 286.—Farm of 110 acres, situated in Union Township; one-half mile from Gastonville postoffice; Gastonville is on the line of the B. & O. Railroad; one-half mile from school, church and milk station. Good roads. Surface is hilly. Part of the soil is limestone. 25 acres in meadow; 4 acres in timber; 106 acres tillable. Some apple, plum and peach trees. Adapted to general farm crops. Wire, rail and board fences. Small house. Barn, 40x50 feet. Wagon shed. Buildings and fields are watered by springs. Price, \$75.00 per acre. Terms, to suit purchaser. One mile from street car line to Pittsburgh. Address T. J. Fawcett, R. D. No. 2, Finleyville, Pa.

Wayne County.

No. 287.—Farm of 100 acres, situated in Sterling Township; five miles from Moscow and Elmhurst; four miles from railway station at Wimmers, on line of Erie and Wyoming Railroad; one mile from school and church. Good roads. Part of the surface is rolling and part level. High altitude. Clay and loam soil. 40 acres in meadow; 20 acres in timber; 60 acres tillable. Some fruit, consisting of apple, peach, cherry, plum and pear. Adapted to oats, potatoes, corn and buckwheat. Wire and stone wall fences, all good. Ten-room house with porches. Two large barns. Silo, hen house, ice house and hog house. Buildings watered by well; fields by springs and brooks. Price, \$3,300.00. Terms, \$2,000.00 cash and balance on mortgage. Fine dairy and fruit farm. Near good neighbors and good market. Address Ralph M. Swingle, R. D., Elmhurst, Pa.

No. 288.—Farm of 135 acres, situated in Sterling Township; one mile from Sterling; five and one-half miles from railway station, on line of Erie and Wyoming Railroad; one mile from school and church; two miles from creamery and milk station. Good state road. Surface is rolling. Altitude is high and a fine view of surrounding country. Soil is clay with loam subsoil. 60 acres in meadow; 25 acres in timber, largely second growth; 60 acres tillable. Fruit: 400 apple, 55 peach and some cherry, plum and pear trees. Adapted to corn, oats, buckwheat, rye and potatoes. Wire and stone wall fences, all good. Two-story house, twelve rooms, slate roof and well painted. Two large barns, poultry house, hog house and ice house. Water at house and barn. Fields are watered by springs and brook. Price, \$4,000.00. Terms, \$2,000.00 cash and balance on mortgage. Telephone line passes house. Rural mail service. Large lawn and plenty of old shade trees. Address A. F. Swingle, R. D., Ariel, Pa.

No. 289.—Farm of 113 acres, situated in Oregon Township; one-half mile from Torrey postoffice; six miles from railway station at Honesdale, on line of Erie and D. & H. Railroads; one-eighth mile from school and church. Good roads. Honesdale, the county seat, has a population of about 4,000. Surface is rolling. Red shale soil. 35 acres in meadow; 20 acres in second growth timber; 35 acres tillable. Orchard consisting of apple, pear, plum and peach trees. Adapted to corn, oats, buckwheat, potatoes and rye. Stone and wire fences, in excellent condition. Seven-room house, good condition. Two barns, wagon shed and poultry house. Well at barn and house. Fields are watered by springs. Price, \$3,500.00. Terms, two-thirds cash and balance on time. This farm is in a first-class state of cultivation. Telephone connecton and daily mail. Address D. W. Scudder, Honesdale, Pa.

No. 290.—Farm of 70 acres, located in Lake Township; three-fourths mile from Gravity postoffice, R. D. No. 1; Gravity is on the line of the Erie Railroad; near school and church; three-fourths mile from creamery; one mile from cheese factory, milk station and condensery. Roads are good but a little hilly. Surface is rolling. Dark loam soil. 20 acers in meadow; 5 acres in timber, beech, maple and chestnut; 35 acres tillable. 125 apple and some peach, plum and pear trees. Adapted to corn, potatoes, oats and buckwheat. Stone wall and wire fences, fair condition. House with porches. Basement barn, 22x36 feet. Well at house and barn. Springs in fields. Price, \$5,000.00. Terms, part cash and balance on time. This farm is in the village of Gravity. One mile to Lake Ariel summer resort. Address C. A. Masters, R. D. No. 1, Gravity, Pa.

No. 291.—Farm of 200 acres, situated in Manchester Township; four miles from Equinunk postoffice, R. D. No. 1; five miles from

Lordville station, on line of Erie Railroad; one-half mile from school; two miles from church; one and one-half miles from creamery. Good roads but somewhat hilly. Surface slopes gently to the east. Soil is red shale and is very productive. 50 acres in meadow; 50 acres in timber, maple, beech and birch; 100 acres in pasture; 75 acres tillable. Apple, peach, pear and cherry orchard. Adapted to corn, oats, buckwheat and potatoes. Wire fences, good condition. House with addition and porches, good condition. Barn, 32x56 feet, chicken house, hog house, granary, etc. Running water in house and at barn. Fields watered by springs. Price, \$4,250.00. Terms, cash. Barn has basement and house has large cellar. Address Harris G. Hill, Equinunk, Pa.

Westmoreland County.

No. 292.—Farm of 38 acres, located in Ligonier Township; one mile from Ligonier postoffice, R. D. No. 3; Ligonier is on the line of the L. V. Railroad; one-half mile from school; one mile from church; one mile from creamery and milk station. Macadam state roads. Surface is level. Altitude, 1,100 feet. Shale and clay soil. 36 acres are tillable and the other two acres are in oak timber. All kinds of fruit. Adapted to corn, wheat, oats, hay and alfalfa. All wire fences. House, 36x36 feet, eight rooms and bath. Barn in fine condition, large hog house and poultry houses. Running water at house and barn. Price, \$5,500.00. Terms, to suit purchaser. This farm is one of the best located in the county and would make a fine truck farm. Address C. M. Robb, Ligonier, Pa., Star Route.

No. 293.—Farm of 115 acres, located in East Huntingdon Township; one-half mile from Alverton postoffice, R. D. No. 3; Alverton is on line of the S. W. P. Railroad; one-half mile from school, church and milk station. Roads are good but hilly. About 40 acres of the surface is level and the balance is rolling. Limestone soil. 40 acres in meadow; 100 acres tillable. 100 peach, 25 apple and some pear, plum and quince trees. 250 grape vines. Adapted to corn, oats and wheat. Wire fences. Brick house, nine rooms, slate roof, good condition. Barn, 60x80 feet, good condition. Two corn cribs. House is watered by well; barn by cistern; fields by spring. Price, \$10,000.00. Terms, to suit purchaser. Underlaid with Freeport vein coal. Good limestone. Never-failing water. Five minutes walk to street car line. Owners, C. Fox Estate, Address Nora A. Fox, Alverton, Pa.

No. 294.—Farm of 70 acres, located in Donegal Township; three and one-half miles from Jones Mills postoffice; Jones Mills is on the line of the Indian Creek Valley Railroad; one and one-half miles from school; three miles from church. Part of the surface is hilly

and part level. 10 acres in meadow; 20 acres in timber; 60 acres tillable. Choice fruit consisting of apples, prunes, plums and grapes. Adapted to corn, oats, buckwheat and potatoes. Rail and wire fences. Frame house, in good condition. Bank barn, wood shed, hog pen and other outbuildings. Water is piped to the house. Spring at the barn. Price, \$2,500.00. Terms, one-half cash and residue in two equal annual payments. Good limestone one mile away. Sugar camp on this farm. Good place to raise sheep. Address John M. Nedrow, Jones Mills, Pa.

No. 295.—Farm of 119 acres, located in Washington Township; three miles from Salina postoffice, R. D. No. 1; Salina is on the line of the West Penn Railroad; one mile from school and three miles from church; three miles from milk station. State road; part of brick construction. Part of the surface is rolling and part level—all can be worked with machinery. Clay loam with some sandy soil. 55 acres in meadow; 15 acres in timber, oak and hickory. No wasteland. 200 apple, 300 peach, 30 cherry and 15 pear trees. Adapted to wheat, oats, rye, potatoes, clover and timothy. Farm is partly fenced with good wire fencing. New cottage house, eight rooms. Barn, 45x70 feet, double barn floors. Chicken coop and hog house. Buildings and fields are watered by springs. Price, \$6,000.00. Terms, one-half cash and balance on easy terms. This is only one-half the real value of this farm. It is a bargain. Address C. W. Mauk, R. D. No. 1, Salina, Pa.

No. 296.—Farm of 198 acres, one-half mile from Ligonier postoffice; one mile from railway station at Ligonier on line of Ligonier Valley Railroad; one-half mile from school and church. Good roads. Surface is rolling. About 170 acres tillable. Adapted to oats, wheat and corn. Some wire fence. Frame house, eight rooms and hall. Two large barns. Running water at house and barn. Price, \$10,000.00. Terms, to suit purchaser. Incumbrance of \$3,500.00 on this farm. Address Mrs. J. G. Noble or Mrs. J. A. Carey, 122 North N. St., Muskogee, Okla.

No. 297.—Farm of 69½ acres, situated in Unity Township; one-eighth mile from Crabtree postoffice; three miles from railway station at Latrobe, on line of Pennsylvania Railroad; near school; two miles from church; two and one-half miles from milk station. Good roads. Surface is rolling. Sandy soil. 10 acres in meadow; 6 acres in timber; 60 acres tillable. Apples, peaches, plums, cherries and grapes. Adapted to general farming. New wire and rail fences. Good house, 16x32 feet, newly painted. Barn, 40x50 feet. Wagon shed, pig pen and spring house. House is watered by spring; fields by never-failing run. Price, \$5,500.00. Terms, cash. Gas lease on farm. Freeport coal. Address Thomas A. Bridge, Executor, Latrobe, Pa.

Wyoming County.

No. 298. —Farm of 162 acres, located in Mehoopany Township; two miles from Mehoopany postoffice, R. D. No. 1; Mehoopany is on line of the L. V. Railroad; two and one-fourth miles from school; two miles from church; two and one-half miles from milk station. Good roads. Red shale soil. 25 acres in meadow; 40 acres in timber; 120 acres tillable. 450 peach trees, 50 apple and some small fruits. Adapted to general farm crops. Stone wall, wire and rail fences. House, 26x36 feet, eight rooms and bath, new porch. Bank barn, 36x46 feet. Wagon house, straw shed and sheep shed. Running water in house and at the barn. Fine springs in the fields. Price, \$5,500.00. Terms, cash. Near good neighbors. Pupils conveyed to high school. Will sell livestock, implements, etc., if desired. Good site for water power electric light plant. Address E. S. Robinson, R. D. No. 1, Mehoopany, Pa.

No. 299.—Farm of 13 acres, situated in Washington Township; four miles from Tunkhannock postoffice, R. D. No. 3; two miles from railway station at Vosburg, on line of Lehigh Valley Railroad; one mile from school and church; two miles from creamery, cheese factory, milk station and milk condensery. Good state road. Tunkhannock, the county seat, is four miles distant and has a population of about 2,000. Good quality soil. 12 acres tillable. 20 apple trees. Adapted to berries, fruits and general crops. Stone wall and wire fences, in good condition. Good house, 18x20 feet. Barn, 25x40 feet, in fair condition. Good chicken house. House is watered by spring; barn by creek. Price, \$875.00. Terms, \$300.00 cash and the balance on time. Address M. Walter Matz, Tunkhannock, Pa.

No. 300.—Farm of 24 acres, situated in Washington Township; four miles from Meshoppen postoffice, R. D. No. 4; two miles from railway station at Lemon, on line of Montrose Branch, Lehigh Valley Railroad; one-fourth mile to school and church; two miles from creamery and milk station. Good roads. Flat creek bottom and some rolling land. Good loam soil. 20 acres tillable; 4 acres in meadow. Some fruit trees. Adapted to general grain and hay crops. Woven wire and stone fences. Three story basement house, five rooms finished. Barn with shed attached. Spring near house and barn. Price, \$1,400.00. Terms, cash. Address Mrs. Emma H. Diamond, R. D. No. 4, Meshoppen, Pa.

No. 301.—Farm of 200 acres, situated in Noxen Township; one mile from Noxen postoffice, R. D. No. 1; railway station at Noxen is on line of the Lehigh Valley Railroad; one mile from school and church. Surface is mostly hillside and terrace. Good clay loam soil with clay subsoil. 100 acres in meadow; 40 acres in timber, young poplar, basswood, chestnut and oak. Whole farm can be cul-

tivated if cleared. About 30 apple trees and some pear, peach, plum and cherry trees. Adapted to fruit, hay and livestock. Wire, rail and stone fences, fair condition. L house, 16x35 and 16x18 feet, cellar under whole house. Two barns, two hen coops and other out-buildings, condition fair. Flowing spring inside of house; barn is handy to brook; excellent springs in the fields. Price, \$5,000.00. Terms, easy. Excellent opportunity for combining fruit and stock farming. Address L. R. Lutes, Noxen, Pa.

No. 302.—Farm of 178 acres, located in Washington Township; seven miles from Tunkhannock postoffice, R. D. No. 3; two miles from railway station at Mehoopany, on line of the Lehigh Valley Railroad; one mile from school; one mile from Baptist and Methodist churches. Roads are good and not very hilly. Surface is mostly level. Altitude is about 700 feet. Clay soil. 35 acres in meadow; 80 acres in timber, oak, chestnut and hemlock; 98 acres tillable. Apple, cherry and plum orchard. Wire, rail and stone wall fences, in fair condition. Twelve-room house, in good condition. Barn, 40x50 feet, with annex. Running water at house and barn. Spring in the fields. Price, \$6,000.00. Terms, reasonable. A grove of large trees in front of the house. This is a very nice summer home. Address Mrs. G. E. Detrick, R. D. No. 3, Tunkhannock, Pa.

No. 303.—Farm of 90 acres, situated in Overfield Township; one mile from Lake Winola postoffice, R. D. No. 3; four miles from railway station at La Grange, on line of Lehigh Valley Railroad; one mile from school and church; one mile from milk station; two miles from creamery. Good roads. Surface is rolling. Altitude, about 1,000 feet. Good clay loam soil. 45 acres in meadow; 24 acres in small oak and chestnut timber; 60 acres tillable. 125 apple, grafted winter fruit; 25 pears, choice varieties. Adapted to grass, potatoes, rye, oats and gardening. Wire and rail fences. Nine-room house. Two barns, one with basement. New ice house, hen house, etc. Buildings and fields are watered by springs. Price, \$4,000.00. Terms, one-half cash and balance on easy terms. The location is delightful. Less than one mile to Lake Winola, the famous summer resort. Address Herbert M. Pease, Executor, Sayre, Pa.

No. 304.—Farm of 60 acres, situated in Tunkhannock Township; one mile from Tunkhannock postoffice, R. D. No. 3; Tunkhannock is on line of the L. V. Railroad; one mile from school and church; one mile to milk station and condensing plant. State road, good. One-half of this farm is level and the rest is rolling. Altitude, 750 feet. Rich soil. 20 acres in meadow; 15 acres in chestnut and oak timber; 45 acres tillable. Apple, pear, plum and peach orchard. Adapted to corn, potatoes, hay, strawberries and garden truck. Stone wall and wire fences. Large house and in good condition. Good large

barn. Farm and buildings are watered by running water. Price, \$5,000.00. Terms, easy. The southern end of this farm borders on the Susquehanna river and the L. V. Railroad. Address F. J. Bardwell, M. D., 21 West Tioga street, Tunkhannock, Pa.

No. 305.—Farm of 72 acres, situated in Tunkhannock Township; three miles from Tunkhannock postoffice, R. D. No. 1; Tunkhannock is on the line of the Lehigh Valley Railroad; one mile from school; three miles from the Presbyterian, Methodist, Baptist and Catholic churches; three miles to creamery and milk station. State and township roads. Surface is rolling. Loam soil. 35 acres in meadow; eight acres in oak, ash, hemlock, hickory and chestnut timber; 35 acres tillable. Orchard of choice fruit. Adapted to hay, oats, rye, buckwheat and potatoes. Good wire fences. Eleven-room house, good condition. Barn, 40x50 feet, with wagon shed attached. Well at house and running water in the fields. Price, \$4,000.00. Terms, to suit purchaser. This farm is located one mile from Lake Cary summer resort. Address Jacob Christ and Wife, 3740 Birney avenue, Moosic, Pa.

No. 306.—Farm of 125 acres, located one and one-half miles from Tunkhannock postoffice, R. D. No. 1; one mile from school and church. Good roads. The tillable land is rolling. The soil is part loam and part shale. 40 acres in timber, white pine, rock oak, chestnut and others. 110 acres tillable if cleared. 150 apple trees, ten varieties; pear, plum, cherry and others. Adapted to general crops. Stone, rail, board and wire fences, fair condition. Two house—one has ten rooms and the other has eight. Large barn. Water is piped to house and barn. Price, \$5,500.00. Terms, one-fourth down and the balance on time. I will make an allowance of \$1,000.00 for the timber. Address W. D. Rouse, Tunkhannock, Pa.

York County.

No. 307.—Farm of 138 acres, situated in Dover Township; one-half mile from Dover postoffice, R. D. No. 1; one-fourth mile from railway station at Fox Run, on line of York & Dover Trolley; one-fourth mile from school; one-half mile from Lutheran, Reformed and Evangelical churches; one-half mile from creamery. Good roads. York, the county seat, is six miles distant and has a population of 50,000. Surface is rolling and level. Soil is good and rather sandy. 15 acres in meadow; 15 acres in timber; 108 acres tillable. Fruit: 50 apple, 12 cherry, 50 peach, 12 pear and 24 shellbark trees. Adapted to wheat, corn, rye, oats, hay, etc. Post and rail and wire fences, fairly good. Brick house, 20x25 feet, good as new. Bank barn, 40x80 feet, built twelve years ago. Wagon shed, corn crib, hog pen and other out-buildings. House is watered by artesian well; barn

by spring; fields by run. Price, \$85.00 per acre. Terms, cash. Dower in this farm. Trolley line along the western border of farm. House and barn were painted recently. Address L. H. Fackler, 451 West Market street, York, Pa.

No. 308.—Farm of 17 acres, situated in Springetsburg Township; five miles from York, R. D. No. 7; one mile from Stony Brook, on line of Frederic Division, Pennsylvania Railroad; one mile from school; one mile from Presbyterian, Lutheran, Reformed, Mennonite and Evangelical churches; one mile from milk station. Good roads. Surface is rolling. Chester loam soil. 15 acres tillable; one acre of timber, white oak, hickory, chestnut, etc. Adapted to tobacco, wheat, corn, timothy, clover, etc. Wire and rail fences. No buildings. Price, \$90.00 per acre. Terms, cash. This land is about one mile north of the Lincoln Highway. Address Kerwin W. Hauser, R. D. No. 7, York, Pa.

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BULLETIN NO. 274

LINSEED OIL REPORT

1915

JAMES W. KELLOGG,
Chief Chemist



CHARLES E. PATTON, Secretary of Agriculture.

Published by Direction of The Secretary of Agriculture

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1916.

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LETTER OF TRANSMITTAL

DEPARTMENT OF AGRICULTURE. BUREAU OF CHEMISTRY.

Harrisburg, Pa., Feb. 14, 1916.

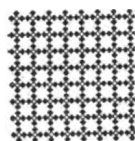
Hon. Charles E. Patton, Secretary of Agriculture, Harrisburg, Pa.

Dear Sir:—I have the honor to submit herewith for your approval a report of the work performed by the Bureau of Chemistry during the year 1915, showing the number of samples of Linseed Oil purchased from Dealers in the State and analyzed in accordance with the provisions of the Linseed Oil Law.

It is recommended that this report be published in bulletin form for distribution.

Very respectfully,

JAMES W. KELLOGG,
Chief Chemist.



LINSEED OIL REPORT

1915

JAMES W. KELLOGG

VICTOR B. HAUSKNECHT

INTRODUCTION

During the year 1915 there were 185 samples of Oil purchased for pure raw and boiled Linseed Oil by our Special Agent from Dealers in various localities in the State which were sent to the Bureau of Chemistry for analysis. These samples when purchased were placed in clean bottles, sealed and sent to the Chief Chemist together with a report covering each sample showing the kind of Oil, the names and addresses of Manufacturers or Importers and Dealers, the amount of Oil represented by each sample and the conditions under which they were obtained. They were carefully analyzed and in addition to the reports made to the Secretary of Agriculture, a report was mailed to each Dealer from whom the samples were secured and to the Manufacturers or Importers in each case advising whether or not the results of analysis showed the samples to pass the established standards of purity.

In a few cases, as will be noted by referring to the table showing the results of inspection where samples were found to be adulterated, prosecutions were immediately ordered which resulted in fines of \$50.00 being paid by the defendants in each case for selling impure Linseed Oil in violation of the Law.

There were only two parties who took advantage during the year of the provisions in the Law which provides for the analysis of special samples for the fee of \$1.00. These samples were found to be pure and to pass the prescribed standards of purity. Reports were made to the senders in each case and the fees received were paid to the State Treasurer as required.

The Law regulating the sale of Paint, Putty and Turpentine passed by the General Assembly of 1915 and which became effective December 1, 1915, will in a measure regulate the use and sale of Linseed Oil, as where any statement or claim is made for the purity of Linseed Oil used in Paints, it must be pure otherwise there will be a violation of the Paint Law in this respect. Inasmuch as the Linseed Oil inspection work is so closely allied and associated with the Paint industry and with the analysis of Paints and painting materials, the future Linseed Oil reports will be included with the reports of the Paint inspection work. The Report for 1916 therefore will be a "Paint and Oil Report" and will show the results of the year's inspection work in enforcing the Laws regulating the sale of Paints, Linseed Oils, Putties and Turpentine. Anyone interested in this work may receive copies of the annual reports free of charge by writing to the Department and requesting that their names be placed on the mailing list.

STANDARDS OF PURITY.

In order to ascertain whether or not Linseed Oil is pure, it is necessary to analyze samples for characteristic properties known as "Constants" and also to make tests for foreign oils. The Law, in addition to requiring that Oils shall be pure and free from added foreign oils, prescribes certain standard constants which raw and boiled Linseed Oil shall possess in order to be considered pure. These standards which are fully explained in technical books on the subject and which were described in the Linseed Oil report for 1913 and 1914 are as follows:

RAW LINSEED OIL:

Specific Gravity at 15.5° C. .9315 to .9360.
Saponification Value (Koettstorfer number) 187 to 195.
Iodine Value (Hanus number) 170 to 190.
Unsaponifiable Matter not to exceed 1.5%.
Acid Value not to exceed 6.

BOILED LINSEED OIL:

Specific Gravity at 15.5° C. .9325 to .9450.
Saponification Value (Koettstorfer number) 185 to 195.
Iodine Value (Hanus number) 160 to 190.
Unsaponifiable Matter not to exceed 2 per cent.
Not to contain free Rosin or Rosin Oil, nor Rosin as Resinates in excess of 1 per centum.
Heated to a temperature of at least 107° C.

ANALYSIS OF SPECIAL SAMPLES.

In addition to the collection and analysis of samples of Oil offered for sale in the State, the law provides for the analysis of special samples sent to the Department by any citizen of Pennsylvania for the fee

of \$1.00 for each sample. Whenever there is any doubt as to the purity of the Linseed Oil being offered for sale or purchased, dealers and consumers should take advantage of this opportunity for protecting themselves against the purchase of inferior oil and should send samples to the Department for analysis. When it is desired to have special samples of Oil analyzed, the following method of procedure should be noted:

Address—The bottle containing the sample of oil should be securely packed and sent by parcel post addressed:—Bureau of Chemistry, Department of Agriculture, Box "R," Harrisburg, Pa.

Analysis Fee—A charge of \$1.00 for each sample analyzed is made as provided by the law and should be sent in the form of a certified check, money order or cash, with a letter requesting the analysis to be made, and advising of the sending of the sample.

Amount of Oil—About one-half pint of the oil to be examined should be carefully drawn from the barrel or other container and placed in a clean bottle. When funnels or measures are used care should be taken that they are clean and free from foreign oils, as otherwise the tests made on an oil contaminated in this way, will be misleading.

As soon as possible after the receipt of samples, a report of the results obtained, together with a receipt for the fee received will be mailed to senders.

PRELIMINARY TESTS MADE FREE OF CHARGE.

Whenever any consumer or dealer located in the State has reason to suspect that the Oil which they have purchased or are about to purchase is not pure or contains mineral or some other foreign oil, the Department will test samples for such adulterants free of charge. This test, however, is only a qualitative or preliminary one and while it does not give a complete analysis, it is sufficient to determine whether or not the sample has been adulterated. Mineral oil is the Oil most frequently used with which to adulterate Linseed Oil and can be easily detected. If the sample submitted is found to be adulterated, this information will be sufficient for the purchaser to reject the shipment and if further evidence of impurity is desired, the sample can be completely analyzed by sending the fee of \$1.00 which is charged.

RESULTS OF INSPECTION.

The Special Agent of the Department, detailed to the Linseed Oil inspection work, purchased 185 samples of Oil which were being sold as pure raw or boiled Linseed Oil from dealers in different parts

of the State and sent them to the Department for analysis. While the number of samples secured does not fairly represent the character of Linseed Oil being sold throughout the State, the results of inspection clearly indicate that all the Oil being sold is not pure and that it is necessary to have a rigid inspection and enforcement of the Linseed Oil Law. Of the number of samples examined, 3 were found to be adulterated with mineral oil in amounts ranging from 6% to 56%. Four samples were found to contain small amounts of turpentine and mineral oil and upon subsequent investigation and from the reports received from the Special Agent, it was found that in these cases the Oils had become accidentally contaminated. The small amounts of foreign oils frequently found present is due rather to carelessness on the part of dealers than to any intention to reduce the quality of the Oil, by using unclean funnels in transferring Oil from one container to another or by emptying Linseed Oil into a tank or barrel which previously had contained turpentine or some other Oil and which had not been cleaned out or entirely removed.

In 6 samples the acid value was found to be slightly in excess of 6, the standard for raw linseed oil but not high enough to seriously effect the quality of the oil. One sample with a high acid value was found to be a special grade of a heavy bodied blown oil. Linseed oil possessing a high acid value usually indicates that it has become rancid or has been pressed from unscreened flaxseed and contains a small amount of oil removed from foreign seeds. A high acid condition may also be due to the presence of rosin acids or in some cases by contamination with unclean containers. In 2 samples of oil there was noted an excessive amount of "foots" or solid matter which, upon standing, would settle out, indicating that the oil had not been properly settled and seasoned before being offered for sale. According to H. A. Gardner, excessive amounts of mucilaginous and albuminous matter contained in linseed oil, commonly called "foots" is unfit for painting purposes as these foots usually contain micro-organisms which will destroy the fatty acids and effect the life of paints in which such oils are used. The high acid value or rancidity of oils is also caused by the setting free of fatty acids.

The following table shows a list of the samples secured and analyzed during the year and whether or not they were adulterated, together with the names and addresses of the dealers from whom they were secured and the names and addresses of the manufacturers or importers. Purchasers who desire to obtain pure linseed oil should carefully note the names of manufacturers who sell their products in Pennsylvania.

RESULT OF INSPECTION.

Chemist's number.	Name and Address of Manufacturer or Importer.	Name and Address of Dealer.	Agent's number.	Kind of oil.	Remarks.
L1277	The Allentown Manufacturing Co., Allentown, Pa.	O. H. Bowersox & Son, Middleburg,	56	Raw	Passed.
L1280	Armstrong, McKelvey Lead & Oil Co., Pittsburgh, Pa.	Farmers' and Contractors' Supply Co., Claysville,	19	Raw	Passed.
L1281	Barber, Rose & Clinton Co., Elmira, N. Y.	O. C. Smith, Wyalusing,	140	Raw	Passed.
L1282	Berwick Store Company, Berwick, Pa.	Brenner Hardware Co., Berwick,	34	Raw	Passed.
L1283	Bright & Co., Reading, Pa.	H. Schmaltz & Co., Kennett Square,	70	Raw	Passed.
L1284	Capital Paint, Oil & Varnish Co., Washington, Pa.	K. M. Hamilton, Houston,	13	Raw	Passed.
L1285	El. C. Cantor & Sons, Birmingham, Del.	Coecker & Mall, New Milford,	122	Raw	Passed.
L1286	N. B. Cantor, Wilmington, Del.	F. Quier & Mackay, West Goshute,	73	Raw	Passed.
L1287	Diamond Oil & Paint Co., Scranton, Pa.	W. H. Tegeler, West Grove,	63	Raw	Passed.
L1288	Diamond Oil & Paint Co., Scranton, Pa.	W. C. Cager, Peckville,	158	Raw	Passed.
L1289	Diamond Oil & Paint Co., Scranton, Pa.	Thomas F. Cawley & Son, Dunmore,	154	Bolled	Passed.
L1290	Diamond Oil & Paint Co., Scranton, Pa.	Durkin Brothers, Taylor,	161	Raw	Passed.
L1291	Diamond Oil & Paint Co., Scranton, Pa.	J. P. Eagen, Archbald,	166	Raw	Passed.
L1292	Diamond Oil & Paint Co., Scranton, Pa.	J. H. Lally, Olyphant,	173	Raw	Passed.
L1293	Diamond Oil & Paint Co., Scranton, Pa.	John McDonnell, Scranton,	165	Raw	Passed.
L1294	Diamond Oil & Paint Co., Scranton, Pa.	Charles Teitelbaum, Throop,	162	Raw	Passed.
L1295	Diamond Oil & Paint Co., Scranton, Pa.	Adolph Wolf, Old Forge,	47	Raw	Passed.
L1296	Diamond Oil & Paint Co., Scranton, Pa.	Soudier & Crouthamel, Sonderton,	147	Raw	Passed.
L1297	Dunlap, Slack & Co., Philadelphia, Pa.	John L. Rockwell, Monroeton,	53	Raw	Passed.
L1298	Eagle Paint & Varnish Co., Towanda, Pa.	A. M. Winschel, Etna,	82	Raw	Passed.
L1299	Felsent Paint & Varnish Co., Pittsburgh, Pa.	W. T. Perkins, Plymouth,	93	Raw	Passed.
L1300	Fulton, Shibley & Co., Philadelphia, Pa.	V. L. Thompson, Feraste,	112	Raw	Passed.
L1301	W. Gilley & Co., Philadelphia, Pa.	Van Engen Brothers, Lehigh,	106	Raw	Passed.
L1302	The Grove Linsed Oil Co., Philadelphia, Pa.	Dallas Hardware Co., Dallas,	159	Bolled	Passed.
L1303	The Grove Linsed Oil Co., Philadelphia, Pa.	James B. Doyle, Scranton,	106	Raw	Passed.
L1304	The Grove Linsed Oil Co., Philadelphia, Pa.	G. T. Farrell, Plains,	79	Bolled	Passed.
L1305	The Grove Linsed Oil Co., Philadelphia, Pa.	Frantz & Co., Wilkes-Barre,	45	Raw	Passed.
L1306	The Grove Linsed Oil Co., Philadelphia, Pa.	L. E. Harpel, Richlandtown,	69	Raw	Passed.
L1307	The Grove Linsed Oil Co., Philadelphia, Pa.	Harvey & McDonald, Kennett Square,	128	Raw	Passed.
L1308	The Grove Linsed Oil Co., Philadelphia, Pa.	C. H. MacConnell, Nicholson,	92	Raw	Passed.
L1309	The Grove Linsed Oil Co., Philadelphia, Pa.	Peter F. Mackin, Exeter,	62	Raw	Passed.
L1310	The Grove Linsed Oil Co., Philadelphia, Pa.	G. M. Rice, Reedsville,	86	Raw	Passed.
L1311	The Grove Linsed Oil Co., Philadelphia, Pa.	H. B. Sharpless, Bloomsburg,	27	Raw	Passed.
L1312	The Grove Linsed Oil Co., Philadelphia, Pa.	T. W. Shoemaker, Wyoming,	40	Raw	Passed.
L1313	The Grove Linsed Oil Co., Philadelphia, Pa.	H. L. Stoneback, Quakertown,		Raw	Passed.

*Heavy bottled blown oil.
†Small amount of turpentine present.

L1350	Spencer Kellogg & Sons, Inc., Buffalo, N. Y.,	T. B. Rogers, Hallstead,	129	Raw,	Passed.
L1351	Spencer Kellogg & Sons, Inc., Buffalo, N. Y.,	Benjamin H. Stock, Tunkhannock,	117	Raw,	Passed.
L1352	Spencer Kellogg & Sons, Inc., Buffalo, N. Y.,	John A. Taylor, Hop Bottom,	136	Raw,	Passed.
L1353	Spencer Kellogg & Sons, Inc., Buffalo, N. Y.,	John W. Wright, Mt. Carmelle,	128	Raw,	Passed.
L1354	Spencer Kellogg & Sons, Inc., Buffalo, N. Y.,	Whipple Brothers, Lackawanna,	111	Raw,	Passed.
L1355	Spencer Kellogg & Sons, Inc., Buffalo, N. Y.,	Jere Woodring & Co., Hazleton,	153	Raw,	Passed.
L1356	Spencer Kellogg & Sons, Inc., Buffalo, N. Y.,	Ziegler & Schumacher, Scranton,	132	Raw,	Passed.
L1357	Spencer Kellogg & Sons, Inc., Buffalo, N. Y.,	J. Evans Wright, Kingston,	97	Bolled,	Passed.
L1358	Lancaster Fire Proofing & Paint Co., Lancaster, Pa.,	Edwards & Co., Parkersburg,	96	Raw,	Passed.
L1359	Lewis & Bennett Hardware Co., Wilkes-Barre, Pa.,	George Lewis, Forty Fort,	90	Raw,	Passed.
L1360	Lewis & Bennett Hardware Co., Wilkes-Barre, Pa.,	J. L. Turner & Co., Nanticoke,	38	Raw,	Passed.
L1361	John T. Lewis & Bros. Co., Philadelphia, Pa.,	Wm. C. Beemer, Yardley,	10	Bolled,	Passed.
L1362	John T. Lewis & Bros. Co., Philadelphia, Pa.,	Cochran & Alcock, Carlisle,	28	Raw,	Passed.
L1363	John T. Lewis & Bros. Co., Philadelphia, Pa.,	J. H. Conley & Sons, Shamokin,	77	Raw,	Passed.
L1364	John T. Lewis & Bros. Co., Philadelphia, Pa.,	Edward Cox, Morrisville,	52	Raw,	Passed.
L1365	John T. Lewis & Bros. Co., Philadelphia, Pa.,	A. H. Raven, Bridgeport,	54	Raw,	Passed.
L1366	John T. Lewis & Bros. Co., Philadelphia, Pa.,	A. E. Emery, Middletown,	74	Bolled,	Passed.
L1367	John T. Lewis & Bros. Co., Philadelphia, Pa.,	J. Egel, & Sons, Pottsville,	25	Bolled,	Passed.
L1368	John T. Lewis & Bros. Co., Philadelphia, Pa.,	W. B. Goodhart, Catawissa,	67	Raw,	Passed.
L1369	John T. Lewis & Bros. Co., Philadelphia, Pa.,	Theo. M. Griffith & Son, East Downingtown,	48	Raw,	Passed.
L1370	John T. Lewis & Bros. Co., Philadelphia, Pa.,	John Hocking & Son, West Grove,	183	Raw,	Passed.
L1371	John T. Lewis & Bros. Co., Philadelphia, Pa.,	E. S. Jacoby & Son, Sellersville,	42	Raw,	Passed.
L1372	John T. Lewis & Bros. Co., Philadelphia, Pa.,	A. S. Kulp, Telford,	29	Bolled,	Passed.
L1373	John T. Lewis & Bros. Co., Philadelphia, Pa.,	Pownall Hardware Co., Coatesville,	44	Raw,	Passed.
L1374	John T. Lewis & Bros. Co., Philadelphia, Pa.,	Louis I. Rubin, Bristol,	40	Raw,	Passed.
L1375	John T. Lewis & Bros. Co., Philadelphia, Pa.,	Sanner Hardware Co., Mt. Carmel,	88	Raw,	Passed.
L1376	John T. Lewis & Bros. Co., Philadelphia, Pa.,	Sheutz & Price, Quakertown,	72	Raw,	Passed.
L1377	John T. Lewis & Bros. Co., Philadelphia, Pa.,	A. M. Wildman, Langhorne,	100	Raw,	Passed.
L1378	John T. Lewis & Bros. Co., Philadelphia, Pa.,	Gug Hardware Co., Chambersburg,	181	Raw,	Passed.
L1379	John T. Lewis & Bros. Co., Philadelphia, Pa.,	Wm. B. Fryer, Langhorne,	176	Raw,	Passed.
L1380	John T. Lewis & Bros. Co., Philadelphia, Pa.,	F. M. Swartz, York,	115	Bolled,	Passed.
L1381	John T. Lewis & Bros. Co., Philadelphia, Pa.,	C. Y. Swartz, York,	121	Raw,	Passed.
L1382	John T. Lewis & Bros. Co., Philadelphia, Pa.,	E. H. Fisk, Dalton,	13	Raw,	Passed.
L1383	Maloney Oil Manufacturing Co., Scranton, Pa.,	F. R. Thurston, Factoryville,	98	Bolled,	Passed.
L1384	Maloney Oil Manufacturing Co., Scranton, Pa.,	Almrich & Co., Forest City,	181	Raw,	Passed.
L1385	The Mann Brothers Co., Buffalo, N. Y.,	R. E. Benscoter, Nesqueh,	76	Raw,	Passed.
L1386	The Mann Brothers Co., Buffalo, N. Y.,	J. L. Briggs, Shickshinny,	115	Bolled,	Passed.
L1387	The Mann Brothers Co., Buffalo, N. Y.,	W. M. Carter, Meshoppen,	121	Raw,	Passed.
L1388	The Mann Brothers Co., Buffalo, N. Y.,	T. Harry Doan, Berwick,	13	Raw,	Passed.
L1389	The Mann Brothers Co., Buffalo, N. Y.,	A. E. Fitch, Factoryville,	98	Bolled,	Passed.
L1390	The Mann Brothers Co., Buffalo, N. Y.,	Graham & Laughlin, Newville,	181	Bolled,	Passed.
L1391	The Mann Brothers Co., Buffalo, N. Y.,	Hill & Evans, Antietam,	151	Bolled,	Passed.
L1392	The Mann Brothers Co., Buffalo, N. Y.,	C. H. J. Ober, Nanticoke,	35	Raw,	Passed.
L1393	The Mann Brothers Co., Buffalo, N. Y.,	Thos. H. Leonard Co., Scranton,	8	Raw,	Passed.
L1394	The Mann Brothers Co., Buffalo, N. Y.,	Max Ludwig, Pittston,	144	Bolled,	Passed.
L1395	The Mann Brothers Co., Buffalo, N. Y.,	J. W. McPherson & Sons, Shippensburg,	125	Bolled,	Passed.
L1396	The Mann Brothers Co., Buffalo, N. Y.,	George L. Roberts Co., Athens,	109	Raw,	Passed.
L1397	The Mann Brothers Co., Buffalo, N. Y.,	J. J. Ryan & Co., Montrose,	156	Bolled,	Passed.
L1398	The Mann Brothers Co., Buffalo, N. Y.,	A. Ryman & Sons, Dallas,	109	Raw,	Passed.
L1399	The Mann Brothers Co., Buffalo, N. Y.,	Schneider Brothers, Scranton,	156	Bolled,	Passed.

*Accidently contaminated with small amount of mineral oil.

RESULTS OF INSPECTION—Concluded.

Chemist's number.	Name and Address of Manufacturer or Importer.	Name and Address of Dealer.	Agent's number.	Kind of oil.	Remarks.
L1378	The Mann Brothers Co., Buffalo, N. Y.	Schneider Brothers, Scranton, Pa.	157	Raw	Passed.
L1379	The Mann Brothers Co., Buffalo, N. Y.	J. B. Seligman, Westtown, Pa.	157	Raw	Passed.
L1380	The Mann Brothers Co., Buffalo, N. Y.	G. W. Sheary, Lewistown, Pa.	60	Raw	Passed.
L1381	The Mann Brothers Co., Buffalo, N. Y.	J. F. Snyder, Mercersburg, Pa.	61	Raw	Passed.
L1382	The Mann Brothers Co., Buffalo, N. Y.	John Watts, Belleville, Pa.	113	Raw	Passed.
L1383	The Mann Brothers Co., Buffalo, N. Y.	James Whitaker, Hazleton, Pa.	116	Raw	Passed.
L1384	The Mann Brothers Co., Buffalo, N. Y.	Williams Hardware Co., Tunkhannock, Pa.	114	Bolled	Passed.
L1385	The Mann Brothers Co., Buffalo, N. Y.	J. D. Woodworth's Sons, Shickshinny, Pa.	163	Raw	Passed.
L1386	The Mann Brothers Co., Buffalo, N. Y.	J. G. Bone & Son, Dunmore, Pa.	157	Raw	Passed.
L1387	The Mann Brothers Co., Buffalo, N. Y.	W. P. Kennedy, Dickson City, Pa.	123	Raw	Passed.
L1388	Matthews Brothers, Inc., Scranton, Pa.	W. D. Cox, Hallstead, Pa.	124	Raw	Passed.
L1389	E. C. McKallor Drug Co., Binghamton, N. Y.	L. N. Reynolds, Nicholson, Pa.	108	Raw	Passed.
L1390	Midland Linsed Products Co., New York, N. Y.	Jacob Kurloncheck, Duryea, Pa.	77	Pale Bolled	Passed.
L1391	Midland Linsed Products Co., New York, N. Y.	Lewis Bennett, Hazleton, Pa.	76	Pale Bolled	Passed.
L1392	Midland Linsed Products Co., New York, N. Y.	Pharmacia, Washington, Pa.	78	Pale Bolled	Passed.
L1393	Midland Linsed Products Co., New York, N. Y.	C. Morgan's Sons, Wilkes-Barre, Pa.	96	Pale Bolled	Passed.
L1394	Midland Linsed Products Co., New York, N. Y.	A. J. Roat Supply Co., Kingston, Pa.	96	Pale Bolled	Passed.
L1395	Midland Linsed Products Co., New York, N. Y.	A. J. Roat Supply Co., Kingston, Pa.	113	Pale Bolled	Passed.
L1396	Midland Linsed Products Co., New York, N. Y.	Tom Trethaway, Parsons, Pa.	110	Raw	Passed.
L1397	Midland Linsed Products Co., New York, N. Y.	Wagner Hardware Co., Hazleton, Pa.	80	Raw	Passed.
L1398	Midland Linsed Products Co., New York, N. Y.	Weiss & Wallace Co., Inc., Wilkes-Barre, Pa.	81	Raw	Passed.
L1399	Midland Linsed Products Co., New York, N. Y.	White Hardware Co., Wilkes-Barre, Pa.	103	Bolled	Passed.
L1400	Midland Linsed Products Co., New York, N. Y.	L. Raittmore, Duryea, Pa.	46	Raw	Adulterated.
L1401	Midland Linsed Products Co., New York, N. Y.	A. O. Gehman, Coopersburg, Pa.	99	Raw	Passed.
L1402	Midland Linsed Products Co., New York, N. Y.	Charles W. Vincent, Ashley, Pa.	104	Raw	Passed.
L1403	Midland Linsed Products Co., New York, N. Y.	W. A. Walte, Sugar Notch, Pa.	120	Raw	Passed.
L1404	Midland Linsed Products Co., New York, N. Y.	N. E. Davis, McKeonany, Pa.	86	Raw	Passed.
L1405	Midland Linsed Products Co., New York, N. Y.	F. L. Eves, Millville, Pa.	86	Raw	Passed.
L1406	Midland Linsed Products Co., New York, N. Y.	Walter Bratt, Pittston, Pa.	173	Crucita Raw	Passed.
L1407	National Lead Co., New York, N. Y.	Gwin Brothers, Hawley, Pa.	99	Raw	Passed.
L1408	National Lead Co., New York, N. Y.	Walter T. Spary, West Pittston, Pa.	22	Raw	Passed.
L1409	National Lead Co., New York, N. Y.	Crifton Hardware Co., Crifton, Pa.	14	Raw	Passed.
L1410	National Lead & Oil Co., Pittsburgh, Pa.	F. E. Taylor, West Washington, Pa.	1	Raw	Passed.
L1411	National Lead & Oil Co., Pittsburgh, Pa.	Templeton's Drug Store, Washington, Pa.	15	Raw	Passed.
L1412	National Lead & Oil Co., Pittsburgh, Pa.	Eugene E. Nice, Philadelphia, Pa.	41	Raw	Passed.

*Heavy bodied blown oil.

L1274	Pittsburgh Plate Glass Co., Pittsburgh, Pa.,	T. D. Kline, Limerick,	89 Raw	Passed.
L1286	Red Seal "C" Manufacturing Co., Baltimore, Md.,	C. Caldwell, Oxford,	66 Raw	Passed.
L1287	A. J. Roat Supply Co., Kingston, Pa.,	J. J. Jenkins, Edwardsville,	106 Boiled	Passed.
L1291	Samm's Hardware Co., Shamokin, Pa.,	Wm. Fritz & Co., Trevorton,	28 Raw	Passed.
L1292	The Sherwin-Williams Co., Cleveland, Ohio,	Clouse & Hair, New Bloomfield,	72 Raw	Passed.
L1293	The Sherwin-Williams Co., Cleveland, Ohio,	C. M. S. Hilde, Honesdale,	175 Raw	Passed.
L1294	The Sherwin-Williams Co., Cleveland, Ohio,	Wm. J. Hester, McClure,	187 Raw	Passed.
L1295	Robert Shoemaker & Co., Philadelphia, Pa.,	Bennet & Lear, West Chester,	192 Raw	Passed.
L1306	Smith, Kline & French Co., Philadelphia, Pa.,	H. B. Sides, Downingtown,	24 Raw	Passed.
L1307	Wm. M. Spalding, Towanda, Pa.,	Geo. H. Smalley, Monroeton,	148 Raw	Passed.
L1309	The Standard Linseed Co., Cleveland, Ohio,	Eck Brothers, Honesdale,	176 Raw	Adulterated.
L1310	The Standard Linseed Co., Cleveland, Ohio,	Murray Co., Honesdale,	177 Raw	Adulterated.
L1324	Steelman & Archer, Philadelphia, Pa.,	H. W. Owen, Toughkenamon,	73 Raw	Passed.
L1327	Steelman Hardware Co., Lancaster, Pa.,	J. T. Rodgers, Oxford,	66 Raw	Passed.
L1328	Thompson & Co., Pittsburgh, Pa.,	W. Burling, Oxford,	17 Raw	Passed.
L1329	Thompson & Co., Pittsburgh, Pa.,	Geo. Rome & Co., Carnegie,	21 Raw	Passed.
L1330	Thompson & Co., Pittsburgh, Pa.,	Jesse L. Ross & Co., Waynesburg,	13 Raw	Passed.
L1331	Thompson & Co., Pittsburgh, Pa.,	Ralph B. Thompson, Millersburg,	94 Raw	Passed.
L1332	Thompson & Co., Pittsburgh, Pa.,	J. S. Washlaugh, Canonsburg,	121 Raw	Passed.
L1333	Tremam King & Co., Itasca, N. Y.,	Keeney, Wheelock, Eatonsville,	122 Raw	Passed.
L1335	Tremam King & Co., Itasca, N. Y.,	G. A. Hornbeck, Forest City,	118 Raw	Passed.
L1401	Wm. Waterall & Co., Philadelphia, Pa.,	H. C. Messinger & Sons, Conshohocken,	180 Raw	Passed.
L1372	Geo. D. Wetherill & Co., Philadelphia, Pa.,	H. A. Lacey, Laceyville,	51 Raw	Passed.
L1343	Whipple Brothers, Laceyville, Pa.,	Wm. S. Watts, Hawley,	122 Raw	Passed.
L1359	C. A. Woolsey Paint & Color Co., Jersey City, N. J.,	Wm. B. Davis, Edwardsville,	178 Boiled	Passed.
L1323	Unknown,	M. Jevons & Son, Wilkes-Barre,	107 Boiled	Passed.
L1305	Unknown,		82 Raw	Passed.

•Heavy bodied blown oil.



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P46
Commonwealth of Pennsylvania

Pennsylvania.

DEPARTMENT OF AGRICULTURE

Bulletin No. 275.

LIST OF

Fertilizer and Lime Manu- facturers and Importers

AND

Brands of Their Products for Which License to Sell in
Pennsylvania During 1916 was Taken Out Prior
to February 21, 1916.



HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1916

Commonwealth of Pennsylvania

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PENNSYLVANIA FERTILIZER LAW.

AN ACT

To regulate the manufacture and sale of commercial fertilizers; prescribing penalties for its violation, and repealing an act, entitled "An act to regulate the manufacture and sale of commercial fertilizers; providing for its enforcement, and prescribing penalties for its violation," approved the twenty-fifth day of March, Anno Domini one thousand nine hundred and one.

Section 1. Be it enacted, &c., That every package of commercial fertilizer sold, offered, or exposed for sale, for manurial purposes within this Commonwealth, except the dung of domestic animals, lime, marl, and wood-ashes, shall have plainly stamped thereon the name and address of the manufacturer or importer and his place of business, the net weight of the contents of the package, the brand or trade-name of the fertilizer the package contains, and an analysis stating the percentage such fertilizer contains of nitrogen in an available form, of potash soluble in water, of soluble and reverted phosphoric acid, and of insoluble phosphoric acid.

Section 2. Every manufacturer or importer of commercial fertilizers, as specified in section one of this act, shall, on or before the first day of January of each year, or before offering them for sale in this Commonwealth, file annually with the Secretary of Agriculture a statement of the names and number of brands of such commercial fertilizers, having distinct trade-names, that he shall offer for sale during the next ensuing year, and a copy of the analysis of each one of such brands of commercial fertilizers, as required by section one of this act.

Section 3. In addition to the statement required by section two of this act, every manufacturer or importer of commercial fertilizers shall, on or before the first day of January of each year, or before offering them for sale in this Commonwealth, file annually with the Secretary of Agriculture an affidavit showing the amount of each brand of fertilizer, having a distinct trade-name, sold within the Commonwealth during the last preceding year; and if the said amount shall be one hundred tons or less, he or they shall pay or cause to be paid to the Secretary of Agriculture the

sum of fifteen dollars for each and every brand of such commercial fertilizer, having a distinct trade name sold within the State during the last preceding year: and if the said amount shall exceed one hundred tons, and be less than five hundred tons, he or they shall pay the sum of twenty dollars, as aforesaid; and if the said amount shall be five hundred tons or more, he or they shall pay the sum of thirty dollars, as aforesaid. If such manufacturer or manufacturers, importer or importers, shall not have made any sales within the Commonwealth during the preceding year, he or they shall pay the sum of fifteen dollars upon each such brand, as aforesaid: Provided, That all monies so received shall be immediately paid by the Secretary of Agriculture into the State Treasury, for the use of the Commonwealth.

Section 4. No person shall sell, offer, or expose for sale, in this State, any pulverized leather, hair, ground hoofs, horns, or wool waste, raw, steamed, roasted, or in any form, as a fertilizer, or as an ingredient of a fertilizer or manure, without an explicit statement of the fact; said statement to be conspicuously affixed to every package of such fertilizer or manure, and to accompany and go with every lot, parcel, or package of the same.

Section 5. Any person or persons selling, offering, or exposing for sale, any commercial fertilizer, or any brand of the same, having a distinct trade-name, without the analysis required by section one of this act, or with an analysis stating that it contains a larger percentage of any one or more of the above-named constituents than is contained therein, or for the sale of which all the provisions of sections two and three have not been complied with, or any person violating any of the provisions of section four of this act, shall be guilty of a misdemeanor, and, on conviction, shall be sentenced to pay a fine of not less than twenty-five nor more than one hundred dollars for the first offense, and not less than two hundred dollars for each subsequent offense. It shall be the duty of the Secretary of Agriculture to enforce the provisions of this act, and all penalties, costs, and fines recovered shall be paid to him or his duly authorized agent, and by him shall be immediately paid into the State Treasury, for the use of the Commonwealth.

Section 6. The Secretary of Agriculture is hereby empowered to collect samples of commercial fertilizers, either in person or by his duly qualified agent or representative, and to have them analyzed, and to publish the results for the information of the public; and for this purpose the said Secretary of Agriculture, such assistants, agents, experts, chemists, detectives, and counsel as he shall duly authorize, shall have full

access, ingress, and egress to and from all places of business, factories, barns, buildings, carriages, cars, and vessels, used in the manufacture and transportation, or sale, of any commercial fertilizer. They shall also have power to open any package or vessel containing or supposed to contain any commercial fertilizer, and take therefrom samples for analysis, upon tendering the value of said samples.

Section 7. The term "commercial fertilizers," as used in this act, shall be construed to mean any and every substance imported, manufactured, prepared, or sold for fertilizing or manuring purposes, except the dung of domestic animals, marl, lime, and wood-ashes, and not exempt by the provisions of section one of this act.

Section 8. This act shall go into effect on and after the thirty-first day of July, one thousand nine hundred and nine; and the act, entitled "An act to regulate the manufacture and sale of commercial fertilizers; providing for its enforcement, and prescribing penalties for its violation," approved the twenty-fifth day of March, Anno Domini one thousand nine hundred and one, is hereby repealed.

Approved—The 1st day of May, A. D. 1909.

EDWIN S. STUART.

PENNSYLVANIA BONE LAW.

AN ACT

Making it unlawful for any person, firm, or corporation, engaged in the manufacture or sale of commercial fertilizers, to use the word "bone" in connection with, or as part of the name of, any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fertilizer shall be the product of pure animal bone; and providing a penalty for violation of the same.

Section 1. Be it enacted &c., That it shall be unlawful for any person, firm or corporation, engaged in the manufacture or sale of commercial fertilizers, to use the word "bone" in connection with, or as part of the name of, any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fertilizer shall be the product of pure animal bone.

Section 2. Any person or persons violating the provisions of this act shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall pay a fine of fifty dollars for the first offense, and a fine of not less than one hundred dollars, nor more than two hundred dollars, for every subsequent offense; such fine or fines to be paid into the State Treasury, for the use of the Commonwealth. The Secretary of Agriculture shall, together with his deputies, agents, and assistants, be charged with the enforcement of this act.

Section 3. All magistrates, aldermen, and justices of the peace throughout this Commonwealth shall have jurisdiction to hear and determine actions arising from violations of the provisions of this act, and shall have authority to hold for court, or to impose the penalty hereby prescribed, subject to appeal, as the law shall direct.

Section 4. This act shall go into effect on the first day of January, Anno Domini nineteen hundred and ten.

Approved—The 23d day of April, A. D. 1909.

EDWIN S. STUART.

PENNSYLVANIA LIME LAW.

AN ACT

To regulate the sale for agricultural purpose of crushed limestone, lime, gypsum, and related products; defining said products; and prescribing penalties for the violation of this act.

Section 1. Be it enacted &c., That every bag, barrel, or other package or quantity, of any pulverized limestone, ground oyster shells, artificial carbonate of lime, ground lime, spraying lime, slaked-lime, hydrated lime, hydrated spraying lime, marl, gypsum, or land-plaster, sold, offered, or exposed for sale, within this Commonwealth for use as a soil amendment or as an ingredient or reagent in the preparation of any fungicide or insecticide, shall have attached to it or be accompanied, in the manner provided in section three hereof, by a plainly printed statement giving the name and address of the manufacturer or importer and his place of business, the brand or trade-name of said material, the net weight of the contents of the package, when sold in package, and a statement declaring, with respect to pulverized limestone, ground oyster shells, and artificial carbonate of lime: (a) The degree of fineness of the material, in terms of the minimum sieve-mesh, expressed in fractions of an inch, through which the coarsest particles of said material can pass; and (b) the minimum percentages contained or available oxides of calcium and magnesium, respectively, combined as carbonates; with respect to lime, ground lime, spraying lime, slaked-lime, hydrated lime, hydrated spraying lime, and marl, the minimum percentages contained of the available oxides of calcium and magnesium, respectively; and with respect to gypsum, or land-plaster, the minimum percentages contained of available calcium oxide and sulphur trioxide, or sulphuric acid (SO^3) respectively; which statement shall be held to be the guaranty of the manufacturer or importer that the goods to which said statement refers are of the kind and quality, or composition and fineness, so set forth. The provisions of this act shall not, however, apply to air-slaked lime, kiln-slaks, gas-house lime, or tanners' lime, when sold as such.

Section 2. For the purpose of this act, the materials named in the foregoing section are defined as follows:—

(1) Limestone is the rock commonly known by that name, and consisting chiefly of calcium carbonate, or of said carbonate with a smaller molecular proportion of magnesium carbonate.

(2) Pulverized limestone is limestone reduced by mechanical means to a fine powder.

(3) Artificial carbonate of lime is carbonate of lime artificially produced by any method other than the exposure of lime, ground lime, slaked-lime, hydrated lime, or spraying lime to the action of the atmosphere.

(4) Lime is the product obtained by the complete burning of limestone in a kiln, and capable of being reduced by slaking to a fine powder.

(5) Ground lime is lime reduced to a fine powder by grinding.

(6) Spraying lime is lime of high purity, containing not less than ninety-three per centum of calcium oxide and not more than five per centum of magnesium oxide not more than five per centum of carbon dioxide, nor more than five per centum of acid insoluble matters, iron and aluminum oxids, collectively.

(7) Slaked-lime is the dry finely divided product obtained by the addition of water to lime.

(8) Hydrated lime is slaked-lime prepared by the aid of stirring, or of stirring, grinding, and screening machinery, and is free from hard lumps.

(9) Hydrated spraying lime is dry finely divided hydrated lime of purity not less, after taking the water of hydration into account, than that herein required in the case of spraying lime, and of such fineness that all shall pass a standard sieve of one hundred meshes to the inch.

(10) Air-slaked lime is the more or less finely divided product obtained when lime, slaked-lime, hydrated lime, or spraying lime is exposed for a considerable time to the action of the air.

(11) Marl is clay highly charged with carbonate of lime. Shell marl is marl in which the carbonate of lime is present chiefly in the form of molluscan shells.

(12) Gypsum, or land-plaster, is the finely divided mineral, commonly known by that name, and consisting chiefly of calcium sulphate.

(13) Kiln-slaks is refuse lime mixed with ashes and "core", or imperfectly burned limestone.

(14) Gas-house lime is spent lime that has been used as a purifier in the manufacture of illuminating gas.

(15) Tanner's lime is spent lime that has been used in the curing of hides.

Section 3. The statement required by section one this act shall, in the case of goods sold in package, be plainly printed upon the package, or upon a tag or label fastened thereto, of such quality and in such manner that it shall not be detached in handling, and, in the case of goods sold in bulk, the said statement shall be delivered to the purchaser either with the invoice therefor or with the goods.

Section 4. Every manufacturer or importer of one or more of the materials named in section one of this

act, for either or both of the purposes therein stated, shall, on or before the first day of January of each year, or before offering them for sale in this Commonwealth for either of said purposes, file annually with the Secretary of Agriculture a statement of the names and number of brands of such materials having distinct trade-names that he shall offer for sale, for either or both of said purposes, during the next ensuing calendar year or remainder thereof, together with a copy of the statement declaring the composition of these several brands of said materials, as required by section one of this act.

Section 5. In addition to the statement required by section four of this act, every manufacturer or importer of any of the materials named in section one of this act shall on or before the first day of January of each year, or before offering them for sale within this Commonwealth, file annually with the Secretary of Agriculture an affidavit showing, as nearly as practicable, the weight of each brand of said materials sold by him, or, if the producer or vendor be a firm or corporation, by its managers, officers, and agents, within the Commonwealth, for either or both of the purposes named in section one of this act, during the last preceding year; and for each brand so sold he shall pay to the Secretary of Agriculture a license fee, according to the weight sold, as follows: For an amount exceeding one hundred tons, but not exceeding one thousand tons, five dollars; for an amount exceeding one thousand tons, but not exceeding five thousand tons, ten dollars; and for an amount exceeding five thousand tons, twenty dollars; and when said fees shall have been paid, and the statements required by section four of this act have been filed with the Secretary of Agriculture, the party or parties who have made such payment, and otherwise complied with the provisions of this act, shall be entitled to sell within the Commonwealth the goods specified in said statement and covered by said fees during the year, or fraction of a year, immediately following said statement. If the manufacturer or importer shall not have made during the preceding year any sales within the Commonwealth, for the aforesaid purposes, of any brand to be offered for sale during the year for which the fee is to be paid, he shall pay for each such brand a fee of five dollars. All moneys so received shall be immediately paid by the Secretary of Agriculture into the State Treasury, for the use of the Commonwealth.

Section 6. Any person or persons selling, offering, or exposing for sale, for either of the purposes stated in section one of this act, any of the materials named therein or brand of the same, unless accompanied by the statement required by section one of this act, or,

when so accompanied, if the said statements shall be false in any particular, or without having complied with all the foregoing provisions of this act, shall be guilty of a misdemeanor; and on conviction shall be sentenced to pay a fine of not less than ten nor more than fifty dollars for the first offense, and not less than one hundred dollars for each subsequent offense. It shall be the duty of the Secretary of Agriculture to enforce the provisions of this act; and all penalties, costs, and fines recovered shall be paid to him or his duly authorized agent, and by him shall be immediately paid into the State Treasury, for the use of the Commonwealth.

Section 7. The Secretary of Agriculture is hereby empowered to collect samples of the materials named in section one of this act, either in person or by his duly qualified agent or representative, to have them analyzed, and to publish the results for the information of the public; and for this purpose the said Secretary of Agriculture, such assistants, agents, experts, chemists, detectives, and counsel as he shall duly authorize, shall have full access, ingress, and egress to and from all places of business, quarries, kilns, factories, barns, buildings, carriages, cars, and vessels used in the manufacture, storage, transportation, or sale of any of the said materials. They shall also have power to open any package or vessel containing or supposed to contain any of the said materials, and to take therefrom samples for analysis, upon tendering the value of said samples. Any manufacturer or producer of any of the materials named in section one of this act, located in the Commonwealth, shall be entitled to have a single sample of any distinct brand, for the sale of which he has paid the fee required by section five of this act, analyzed by the Department of Agriculture, under such regulations as the Secretary of Agriculture may prescribe with respect to the points of composition specified in said section one, upon sending sample properly sealed and carriage prepaid, together with a fee of one dollar for each such analysis; but not more than two brands shall be analyzed, under the privilege conferred by this proviso, for one manufacturer or producer in a single year. None of the provisions of this act shall apply to sales of limestone, or limestone products or marl, when such sales are made at the quarry or pit in bulk, and delivered to the wagons of the users, who are presumed to be acquainted with the qualities of the local products.

Section 8. To carry out the provisions of this act for the period ending June first, one thousand nine hundred and seventeen, the sum of four thousand dollars (\$4,000), or so much thereof as may be necessary, is hereby specifically appropriated to the Department of Agriculture.

Section 9. This act shall go into effect on the first day of January, one thousand nine hundred and sixteen.

Approved—The 1st day of June, A. D. 1915.

MARTIN G. BRUMBAUGH.

SPECIAL NOTICE.

The attention of local dealers and manufacturers' agents selling commercial fertilizers and lime products for agricultural purposes is called to the list published herewith, of manufacturers, producers and importers, together with a list of the several brands of commercial fertilizers, chemicals and lime products they have registered for sale in this State during the year 1916.

Local dealers and agents should see that all commercial fertilizers and lime products used for agricultural purposes sold, offered, or exposed for sale by them are registered and all other requirements of the laws regulating the sale of the same are complied with for the reason that if they are sold, offered or exposed for sale in violation of these laws, they are, together with the manufacturer, liable to the penalty prescribed therein, governing the manufacture and sale of such commodities in Pennsylvania.

In the event of any claim being made by a manufacturer, importer or producer that certain brands of their products are registered and the names of such products are not contained in this list, it is the duty of agents and dealers to write to the Department and ascertain if such products have been registered subsequently to the publication of this bulletin.

This is one of the means by which such agents and dealers can protect themselves from personal liability to these Acts of Assembly.

CHAS. E. PATTON,
Secretary of Agriculture.

Harrisburg, Pa., February 21, 1916.

LIST OF FERTILIZER MANUFACTURERS AND BRANDS OF THEIR FERTILIZERS FOR WHICH LICENSE TO SELL IN PENNSYLVANIA DURING 1916 WAS TAKEN OUT PRIOR TO AND INCLUDING FEBRUARY 21, 1916.

THE ALLENTOWN MANUFACTURING CO., ALLENTOWN, PA.

Special Complete Phosphate.
 Special \$25.00 Phosphate.
 Pure Ground Bone.
 Acid Phosphate.
 Quick Return Phosphate.

THE AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK CITY.

Apex Acid Phosphate.
 14 Per Cent. Acid Phosphate.
 16 Per Cent. Acid Phosphate.
 18 Per Cent. Acid Phosphate.
 Ammoniated Fertilizer A.
 Ammoniated Fertilizer AA.
 Homestead Good Grower.
 Ammoniated Fertilizer AAA.
 Ammoniated Fertilizer AAAA.
 High Grade Ammoniated Fertilizer.
 Dead Shot Phosphate 1916.
 Eagle Phosphate.
 Wheat, Corn & Grass Fertilizer.
 Tip Top Fertilizer 1916.
 General Crop Grower 1916.
 Odorless Grass & Lawn Top Dressing 1916.
 Complete Manure for Top Dressing 1916.
 Complete Tobacco Manure 1916 (Sulphate).
 American Special.
 Sterling Truck & Top Dressing Mixture.
 Fine Ground Bone.
 High Grade Ground Bone.
 Basic Lime Phosphate.
 Nitrate of Soda.
 Ground Tankage (6 & 30).
 Ground Tankage (9 & 20).
 Ground Untreated Phosphate Rock.
 Dry Ground Fish.
 High Grade Dried Blood.
 Sulphate of Ammonia.
 Dissolved Animal Bone.
 Allen's Popular Phosphate 1916.
 Allen's Potato & Truck Manure 1916.
 Bradley's Niagara Phosphate.
 Bradley's New Method Fertilizer 1916.
 Bradley's B. D. Sea Fowl Guano 1916.

Bradley's Eclipse Phosphate 1916.
 Bradley's Unicorn 1916.
 Bradley's Corn Phosphate 1916.
 Bradley's Potato Fertilizer 1916.
 Bradley's Patent Superphosphate 1916.
 Bradley's Half Century Fertilizer 1916.
 Bradley's X L Superphosphate of Lime 1916.
 Bradley's Potato Manure 1916.
 Bradley's Complete Manure for Potatoes & Vegetables 1916.
 Bradley's Complete Manure for Corn & Grain 1916.
 Bradley's Special Tobacco Manure 1916 (Sulphate).
 Bradley's Golden Eagle 1916.
 Bradley's Complete Manure for Top Dressing Grass & Grain 1916
 Canton Chemical Eagle Phosphate.
 Canton Chemical Harrow Brand Crop Grower.
 Canton Chemical Baker's Special Wheat, Corn & Grass Mixture 1916.
 Canton Chemical Resurgam Guano 1916.
 Canton Chemical Potato & Vegetable Manure 1916.
 Canton Chemical Baker's Fish Guano 1916.
 Canton Chemical A-1 Special Crop Grower 1916.
 Canton Chemical Baker's Standard High Grade Guano 1916.
 Canton Chemical Superior High Grade Fertilizer 1916.
 Canton Chemical Potato & Truck Manure 1916.
 Crocker's General Crop Fertilizer.
 Crocker's Universal Grain Grower 1916.
 Crocker's Complete Manure 1916.
 Crocker's New Rival Fertilizer 1916.
 Crocker's Harvest Jewel Fertilizer 1916.
 Crocker's High Grade Special 1916.
 Crocker's Wheat & Corn Fertilizer 1916.
 Crocker's Potato, Hop & Tobacco Fertilizer 1916.
 Crocker's Ammoniated Super phosphate 1916.
 Crocker's Special Potato Fertilizer 1916.
 Crocker's Best Truck Manure 1916.
 Detrick's Paragon Ammoniated Phosphate & Potash.
 Detrick's Special Ammoniated Compound.
 Detrick's Corn & Oats Fertilizer 1916.
 Detrick's Imperial Compound 1916.
 Detrick's Standard Potash Fertilizer 1916.
 Detrick's Royal Crop Grower 1916.
 Detrick's Kangaroo Komplete Kompond 1916.
 Detrick's Boss Truck Grower 1916.
 Detrick's Quickstep Phosphate for Potatoes & Tobacco 1916.
 Detrick's Potato & Truck Manure.
 East India Economizer Phosphate 1916.
 East India Pilgrim Fertilizer 1916.
 East India Roanoke Phosphate 1916.
 East India Mayflower 1916.
 East India Unexcelled Fertilizer 1916.
 East India Corn King 1916.
 East India Potato & Garden Manure.
 W. S. Farmer & Co. Branch Dissolved S. C. Phosphate.
 W. S. Farmer & Co. Branch High Grade Superphosphate.

W. S. Farmer & Co. Branch Pelican Guano 1916.
 W. S. Farmer & Co. Branch General Crop Grower.
 W. S. Farmer & Co. Branch Clyde Brand 1916.
 W. S. Farmer & Co. Branch Harvest Queen 1916.
 W. S. Farmer & Co. Branch Standard Phosphate 1916.
 Great Eastern Dissolved Acid Phosphate.
 Great Eastern General 1916.
 Great Eastern Special Crop Fertilizer 1916.
 Great Eastern High Grade Potato Fertilizer 1916.
 Great Eastern Northern Corn Special 1916.
 Great Eastern Vegetable, Vine & Tobacco Fertilizer 1916.
 Lazaretto Ammoniated Phosphate 1916.
 Lazaretto Farmer's Choice Brand 1916.
 Lazaretto Extra Ammoniated Phosphate 1916.
 Lazaretto Special Ammoniated Compound 1916.
 Lazaretto Crop Grower 1916.
 Lazaretto Farmers' Reliable 1916.
 Lazaretto AA Superphosphate 1916.
 Lazaretto High Grade Truck Manure 1916.
 Lazaretto Complete Truck Fertilizer 1916.
 Maryland O. K. Ammoniated Fertilizer 1916.
 Maryland Ammoniated Phosphate 1916.
 Maryland Special Compound for Potatoes & Tobacco 1916.
 Michigan Carbon Works Red Line Complete Manure.
 Michigan Carbon Works General Crop Fertilizer 1916.
 Michigan Carbon Works Red Line Guano 1916.
 Michigan Carbon Works Homestead Fertilizer 1916.
 Michigan Carbon Works Homestead High Grade Garden & Vegetable Fertilizer 1916.
 Michigan Carbon Works Homestead Potato & Tobacco Fertilizer 1916.
 Milsom's Erie King Fertilizer.
 Milsom's Wheat, Oats & Barley 1916.
 Milsom's Potato & Cabbage Manure 1916.
 Milsom's Soil Enricher 1916.
 Milsom's Bison Brand 1916.
 Milsom's Buffalo Fertilizer 1916.
 Milsom's Potato, Hop & Tobacco Fertilizer 1916.
 Milsom's Corn Fertilizer 1916.
 Milsom's Medal Brand Manure 1916.
 Milsom's Truck Fertilizer 1916.
 Moro-Phillips' Farmers' Phosphate.
 Moro-Phillips' C & G Complete Fertilizer 1916.
 Moro-Phillips' Standard Guano 1916.
 Moro-Phillips' Farmers' Potato Mixture 1916.
 Moro-Phillips' Leader B & B Fertilizer 1916.
 Moro-Phillips' Pure Phuine 1916.
 Moro-Phillips' Special Fertilizer 1916.
 North Western Complete Compound 1916.
 North Western Challenge Fertilizer 1916.
 North Western Farmers' Standard 1916.
 North Western Shawnee Phosphate 1916.
 North Western Diamond Potash Mixture 1916.
 North Western Homestead Fertilizer 1916.
 North Western Complete Manure 1916.

North Western Red Line Fertilizer 1916.
 North Western Garden Manure 1916.
 Packers' Union Superior Acid Phosphate.
 Packers' Union Universal Fertilizer 1916.
 Packers' Union Superior Crop Grower 1916.
 Packers' Union Animal Corn Fertilizer 1916.
 Packers' Union Potato Manure 1916.
 Packers' Union Gardners' Complete Manure 1916.
 Quinnipiac Climax Phosphate 1916.
 Quinnipiac Mohawk Fertilizer.
 Read's Leader Fertilizer.
 Read's Practical Fertilizer 1916. •
 Read's All Crops Fertilizer 1916.
 Read's Pioneer Fertilizer 1916.
 Read's Corn, Wheat & Rye 1916.
 Read's Farmers' Friend Superphosphate 1916.
 Read's Vegetable & Vine Fertilizer 1916.
 Read's High Grade Farmers' Friend Superphosphate 1916.
 Reese's Half & Half.
 Reese's Challenge Crop Grower 1916.
 Reese's Ammoniated Phosphate Mixture 1916.
 Reese's Harvest Queen 1916.
 Reese's Mayflower 1916.
 Reese's Potato Manure 1916.
 Reese's Potato & Truck Manure 1916.
 Reese's Potato & Truck Special 1916.
 Sharpless & Carpenter's No. 2 for Grain & Grass.
 Sharpless & Carpenter's Royal Spring Mixture 1916.
 Sharpless & Carpenter's Farmers' Brand Phosphate 1916.
 Sharpless & Carpenter's Potato, Corn & Truck Guano 1916.
 Sharpless & Carpenter's Complete Manure 1916.
 Sharpless & Carpenter's No. 1 Brand Phosphate 1916.
 Sharpless & Carpenter's Soluble Tampico Guano 1916.
 Sharpless & Carpenter's Fish Guano 1916.
 Sharpless & Carpenter's Vegetable & Potato Manure 1916.
 Susquehanna Crop Grower.
 Susquehanna XXV Phosphate.
 Susquehanna Ammoniated Phosphate 1916.
 Susquehanna Animal Phosphate 1916.
 Susquehanna Special Potato & Tobacco Manure 1916.
 Susquehanna Potato Phosphate 1916.
 Susquehanna High Grade Truck Mixture 1916.
 Tygert-Allen's Standard Corn & Wheat 1916.
 Tygert-Allen's Star Potato Grower 1916.
 Tygert-Allen's Standard Brand Phosphate 1916.
 Tygert-Allen's Reliable Crop Grower 1916.
 Tygert-Allen's Star Brand Phosphate 1916.
 Tygert-Allen's Soluble Marine Guano 1916.
 Wheeler's Peerless Acid Phosphate.
 Wheeler's High Grade Acid Phosphate.
 Wheeler's Royal Wheat Grower 1916.
 Wheeler's Corn Fertilizer 1916.
 Wheeler's Potato Manure 1916.

Wheeler's Superior Truck 1916.
 Williams & Clark's Prolific Fertilizer.
 Williams & Clark's Special Prolific Crop Producer.
 Williams & Clark's Elk Brand 1916.
 Williams & Clark's Royal Phosphate 1916.
 Williams & Clark's Good Grower 1916.
 Williams & Clark's Matchless Fertilizer 1916.
 Williams & Clark's Americus Corn Phosphate 1916.
 Williams & Clark's Americus Potato Manure 1916.
 Williams & Clark's Meadow Queen Fertilizer 1916.
 Williams & Clark's Americus High Grade Special for Potatoes & Root Crops 1916.
 Williams & Clark's Utility Brand 1916.
 Zell's Little Treasure.
 Zell's Economizer Phosphate 1916.
 Zell's Hustler Phosphate 1916.
 Zell's Ammoniated Superphosphate 1916.
 Zell's Truck Manure 1916.
 Zell's Special Compound for Potatoes & Vegetables 1916.

AMERICAN FERTILIZING CO., BALTIMORE, MD.

American Truck & Vegetable Ammoniated Phosphate.
 American Fish & Bone Special.
 American Champion Ammoniated Super Phosphate.
 American Ammoniated Phosphate.
 American Grain & Grass Ammoniated Phosphate.
 American Grain Reliable Ammoniated Formula.
 American Special Half Per Cent. Formula.
 American Rescue Crop Compound Revised.
 American Fish & Bone Compound Revised.
 American Complete Guano.
 American Reliable Guano.
 American Grain & Grass Grower Revised.
 American Special Formula.
 American Emergency Special Compound Guano.
 American Eagle Crop Grower.
 American High Grade Acid Phosphate.
 Bob White Emergency Compound Revised.
 High Grade Acid Phosphate.
 10 Per Cent. Acid Phosphate.

ARMOUR FERTILIZER WORKS, INC., BALTIMORE, MD.

Star Phosphate 14 Per Cent.
 Acid Phosphate 16 Per Cent.
 Armour's (1½-9-0).
 Armour's (2-11-0).
 Wheat Corn & Oats Special 1-7-1.
 Armour's (2-8-1).
 Armour's (3-8-1).
 Grain Grower 2-8-2.
 Armour's (4-8-2).
 Ground Tankage 7-20.
 Bone Meal 3-22.
 Raw Bone Meal 4½-22½.
 Nitrate of Soda 18 Per Cent.

R. S. AUCKER, SHAMOKIN, PA.

Grade B. Bone & Slaughter House Phosphate.
 Grade D. Phosphate.
 Economy Phosphate.
 Pure Ground Bonemeal.

BALTIMORE FERTILIZER CO., BALTIMORE, MD.

Old Honesty.
 Honest Potato Grower.
 Honest Corn Grower.
 Honest Tankage Rock & Potash.
 Honest Acid Phosphate.

BALTIMORE PULVERIZING CO., BALTIMORE, MD.

Penniman's Special Guano No. 1.
 High Grade Potato Guano.
 Special Spring & Fall Mixture.
 Royal Compound.
 S. C. Phosphate.

BAUGH & SONS CO., PHILADELPHIA, PA.

Baugh's Raw Bone Meal—Warranted Pure.
 Baugh's Fine Ground Bone.
 Baugh's Pure Dissolved Animal Bones.
 Baugh's Pure Steamed Bone.
 Baugh's Export Bone with Potash.
 Baugh's Peninsula Grain Producer.
 Baugh's Corn and Oats Fertilizer.
 Baugh's The Old Stand-By: Dissolved Animal Base.
 Baugh's Truckers Favorite.
 Bugh's High-Grade Ammoniated Animal Base.
 Baugh's Ammoniated Super Phosphate.
 Baugh's Half and Half Mixture.
 Baugh's Animal Base and Potash Compound (For All Crops).
 Baugh's Ammoniated Soluble Alkaline.
 Baugh's Balanced Plant Food (A Superior Fertilizer for General Use).
 Baugh's Commercial Super Phosphate (For General Use).
 Baugh's Complete Animal Base Fertilizer.
 Baugh's Combination Animal Base Fertilizer.
 Baugh's Double Eagle Phosphate.
 Baugh's Excelsior Guano.
 Baugh's General Crop Grower (For All Crops).
 Baugh's Grand Rapid High Grade Guano.
 Baugh's High Grade Potato Grower ("Big Potato" Brand).
 Baugh's Effective Animal Base Manure.
 Baugh's Highly Improved Tobacco Culture Manure.
 Baugh's New Process 10 Per Cent. Guano.
 Baugh's Peruvian Guano Substitute (For Potatoes and All Vegetables).
 Baugh's Potato and Truck Special (For all Truck Crops).
 Baugh's Special Potato Manure.
 Baugh's The Wrapper Leaf Brand (A Special Manure for Seed Leaf Tobacco).

Baugh's High Grade Acid Phosphate.
 Baugh's 16 Per Cent. Acid Phosphate.
 Nitrate Soda.
 High Grade Tankage.

BERGER BROS., EASTON, PA.

Peerless Phosphate 1916.
 Lehigh Superphosphate 1916.
 Farmers Favorite 1916.
 Potato & Truck Specials 1916.

BOWKER FERTILIZER COMPANY, NEW YORK CITY.

Bowker's Superphosphate with Ammonia 1 Per Cent.
 Bowker's Superphosphate with Ammonia 2 Per Cent.
 Bowker's Superphosphate with Ammonia 3 Per Cent.
 Bowker's Superphosphate with Ammonia 4 Per Cent.
 Bowker's Staple Phosphate 1916.
 Bowker's Sure Crop Phosphate 1916.
 Bowker's Farm & Garden Phosphate 1916.
 Bowker's All Round Fertilizer 1916.
 Bowker's Hill & Drill Phosphate 1916.
 Bowker's High Nitrogen Mixture 1916.
 Bowker's Lawn & Garden Dressing 1916.
 Bowker's Ammoniated Food for Flowers.
 Bowker's Potato Phosphate 1916.
 Bowker's Crop Grower.
 Bowker's Complete Alkaline Tobacco Grower 1916 (Sul).
 Bowker's 16 Per Cent. Acid Phosphate.
 Bowker's Bone Flour for Florists' Use.
 Stockbridge General Crop Manure 1916.
 Stockbridge Early Crop Manure 1916.
 Bowker's Soluble Phosphate.
 Bowker's Ammoniated O. I. O. Phosphate.
 Bowker's Fresh Ground Bone.

CAMBRIA FERTILIZER CO., JOHNSTOWN, PA.

Pure Fine Ground Bone Dust.
 Standard Phosphate.

**THE CENTRAL CHEMICAL CO., THOMAS FERTILIZER WORKS,
 HAGERSTOWN, MD.**

CCC Fish Bone & Potash.
 CCC Planters Mixture.
 CCC Golden Sheaf.
 CCC Superior.
 CCC Keystone.
 CCC Golden Sheaf.
 CCC Acme Brand.
 CCC Special Bone Mixture.
 CCC Dissolved Phosphate 16 Per Cent.
 CCC Dissolved Phosphate 14 Per Cent.
 CCC Dissolved Bone.
 CCC Pride of the Valley.

THE CHESAPEAKE CHEMICAL COMPANY, BALTIMORE, MD.

- C. C. Co.'s Dissolved Phosphate 16 Per Cent.
- C. C. Co.'s Dissolved Phosphate 14 Per Cent.
- C. C. Co.'s Dissolved Phosphate 12 Per Cent.

THE COE-MORTIMER CO., NEW YORK CITY.

- E. Frank Coe's High Grade Soluble Phosphate.
- E. Frank Coe's 16 Per Cent. Superphosphate.
- E. Frank Coe's XXV Ammoniated Phosphate 1916.
- E. Frank Coe's Original Ammoniated Dissolved Phosphate 1916.
- E. Frank Coe's High Grade Ammoniated Superphosphate 1916.
- E. Frank Coe's Prolific Crop Producer 1916.
- E. Frank Coe's New Englander Special 1916.
- E. Frank Coe's Pennsylvania No. 1 Grain Special 1916.
- E. Frank Coe's Columbian Corn & Potato Fertilizer 1916.
- E. Frank Coe's Universal Fertilizer 1916.
- E. Frank Coe's Reliable Crop Grower 1916.
- E. Frank Coe's Corn King 1916.
- E. Frank Coe's Gold Brand Excelsior Guano 1916.
- E. Frank Coe's Standard Potato Fertilizer 1916.
- E. Frank Coe's Red Brand Excelsior Guano 1916.
- E. Frank Coe's Morco Top Dresser 1916.
- E. Frank Coe's Basic Fruit & Legume Phosphate (Basic Lime Phosphate) (Key-Plow Brand).
- Nitrate of Soda.
- Fine Ground Bone.

COLUMBIA GUANO COMPANY, BALTIMORE, MD.

- Columbia 14 Per Cent. Acid Phosphate.
- Columbia H. G. 16 Per Cent. Acid Phosphate.
- Columbia Reflex Ammoniated Superphosphate.
- Columbia Miracle Ammoniated Superphosphate.
- Columbia DeLux Ammoniated Superphosphate.
- Columbia Hornbill Ammoniated Superphosphate.
- Columbia Wheat Corn & Grass Special Fertilizer.
- Columbia Growmore Compound.
- Columbia Fertility Guano.
- Columbia Stalwart Compound.

THE CONSUMERS CHEMICAL CORPORATION, NEW YORK CITY.

- Consumer's Pure-Sure Top Dresser (With 1 Per Cent. Potash).
- Consumer's Pure-Sure Truckers Mixture (With 1 Per Cent. Potash).
- Consumer's Pure-Sure Potato Manure (With 2 Per Cent. Potash).
- Consumer's Pure-Sure Potato Manure (Without Potash).
- Consumer's Pure-Sure Potato & Vegetable (With 2 Per Cent. Potash).
- Consumer's Pure-Sure Potato & Vegetable (With 1 Per Cent. Potash).
- Consumer's Pure-Sure Potato & Vegetable (Without Potash).
- Consumer's Pure-Sure Corn & Vegetable (With 1 Per Cent. Potash).
- Consumer's Pure-Sure Corn & Vegetable (Without Potash).
- Consumer's XXX Fish & Potash Mixture.
- Consumer's Pure-Sure Plant Food.

Consumer's Pure-Sure Ammoniated Bonephosphate.
 Consumer's Pure-Sure Acid Phosphate.
 Consumers High Grade Acid Phosphate.
 Nitrate of Soda.
 Consumer's Pure-Sure Corn & Grain Bonephosphate.

JOSIAH COPE & CO., BALTIMORE, MD.

Acidulated Phosphate.
 High Grade Super Phosphate.
 Wheat & Grass Special.
 General Mixture 1916.
 Special Ammoniated Mixture 1916.
 Ammoniated Fertilizer A.
 Ammoniated Fertilizer AA.
 Ammoniated Fertilizer AAA.

HENRY COPE & CO., LINCOLN UNIVERSITY, PA.

Maryland Special.
 Ammoniated Phosphate.
 Potato & Corn Phosphate.
 Wheat Grower & Complete Manure.
 Top Dresser Phosphate.
 Acid Phosphate.
 Nitrate Soda.
 Complete Manure.

JACOB DOLD PACKING CO., BUFFALO, N. Y.

Dold Quality Bone Meal.

HENRY A. DREER, INC., PHILADELPHIA.

Dreer's Peerless Plant Food, Revised.

THE DUNGAN FERTILIZER CO., DOYLESTOWN, PA.

Pebble Hill Home Made Animal Mixture.
 Potato Manure.
 Farmers Favorite.
 Bone Flour.

AMOS EBY & CO., LEAMAN PLACE, PA.

Pequa Economy.
 Pequea Ammoniated.
 Pequea Valley Fertilizer.
 Pequea High Grade.

F. C. EISEMAN, MEADVILLE, PA.

General Crop Grower.

THE ERIE REDUCTION CO., ERIE, PA.

Erie Grain Special.
 General Crop Special.
 Acidulated Fish Special.

EUREKA CHEMICAL CO., BALTIMORE, MD.

Eureka Farmers' Favorite.
 Eureka Dissolved Animal Base.
 Eureka Grain & Grass.
 Eureka Fish & Potash.
 Eureka Potato & Vegetable.

THE EUREKA FERTILIZER CO., LANCASTER, PA.

Grain and Grass.
 Farmers' Favorite.

FARMERS FERTILIZER & FEED CO., WESTMINSTER, MD.

High Grade Phosphate.
 No. 3 Phosphate.
 XX Phosphate.
 Carroll Phosphate.
 Acid Phosphate.

FARMERS FERTILIZER, SEED & HAY CO., WOMELDSORF, PA.

Grass & Grain Grower.

FARMERS FERTILIZER WORKS, ELIZABETHTOWN, PA.

High Grade.
 Pride of Donegal.
 Special Compound.
 Tobacco Special.
 Farmers Club Brand.
 Farmers Golden Sheaf.
 Farmers Crop Grower.

FEDERAL CHEMICAL COMPANY, COLUMBIA, TENN.

Daybreak Tennessee Brown Phosphate Rock.

JOSEPH R. GAWTHROP, KENNETT SQUARE, PA.

Special Potato Phosphate.
 Ammoniated Special Phosphate for Corn, Oats and Wheat.
 Champion Fertilizer for Wheat and Grass.

J. C. GERBIG & SON, CHAMBERSBURG, PA.

Pure Ground Bone.

GRIFFITH & BOYD CO., BALTIMORE, MD.

Harvest Queen Phosphate.
 Ammoniated Bone Phosphate.
 Fish, Bone & Potash.
 Special Royal Guano.
 Truckers Stable Manure.
 High Grade Acid Phosphate.
 Peerless Fertilizer.
 Pure Fine Ground Bone Meal.

Soft Ground Bone Meal.
 Pure Dissolved Animal Bone.
 Farmers Potato & Tomato.
 Fish & Bone Mixture.
 Farmers Bone Mixture.
 Peerless Mixture.
 Queen Guano.
 Cereal Plant Food.

HAFLEIGH & COMPANY, PHILADELPHIA.

Pure Raw Bone Meal.

S. M. HESS & BROTHER, INC., PHILADELPHIA, PA

High Grade Acid Phosphate.
 Special High Grade Acid Phosphate.
 Standard Super Phosphate.
 Reliable Super Phosphate.
 Keystone Phosphate.
 Special Corn Manure 1916.
 Wheat and Grass Manure 1916.
 Farmers' General Fertilizer 1916.
 Reliable Potash Mixture 1916.
 Ammoniated Super Phosphate 1916.
 Fish and Potash Manure 1916.
 Big Crop Fertilizer 1916.
 Potato Manure 1916.
 Special High Grade Fertilizer 1916.
 Superior Super Phosphate.

PHILIP HOFFMAN & BRO., RAUBSVILLE, PA.

Hoffman's Grain & Corn.
 Hoffman's Potato & Truck.

THE HUBBARD FERTILIZER COMPANY, BALTIMORE, MD.

Hubbard's 16 Per Cent. Phosphate.
 Hubbard's 14 Per Cent. Phosphate.

M. P. HUBBARD CO., INC., BALTIMORE, MD.

Hubbard's Domino Compound.
 Hubbard's Good & Cheap.
 Hubbard's Big Jim Compound.
 Hubbard's Dissolved Phosphate.
 Hubbard's Soluble Phosphate.
 Hubbard's Atlas Guano.
 Hubbard's Great Harvest.
 Hubbard's Slaughter House Formular.

J. L. HUNTER & SON, PITTSTON, PA.

Exeter Tankage.

INTERNATIONAL AGRICULTURAL CORPORATION, BUFFALO FERTILIZER WORKS, BUFFALO, N. Y.

Buffalo Top Dresser.
 Buffalo High Grade Manure.
 Buffalo Truck and Onion.
 Buffalo Garden Truck.
 Buffalo Economy.
 Buffalo Vegetable and Potato.
 Buffalo Grain Special.
 Buffalo General Favorite.
 Buffalo Ideal Wheat and Corn.
 Buffalo Ammoniated Phosphate.
 Buffalo Farmers' Choice.
 Buffalo Sixteen Per Cent.
 Buffalo Dissolved Phosphate.
 Buffalo Bone Meal.
 Buffalo Garbage Tankage.

THE JARECKI CHEMICAL CO., SANDUSKY, OHIO.

Lake Erie Guano with Phosphate & Potash.
 Number One Formula.
 Little Giant.
 Tobacco and Truck Grower.
 Raw Bone and Phosphate Mixture.
 Cereals.
 Ammoniated Phosphate.
 C. O. D. Phosphate.
 Pure Ground Bone.

T. S. KENDERDINE & SONS, NEWTOWN. PA.

Kenderdine B. Phosphate.
 Kenderdine Potato Phosphate.
 Kenderdine 4-10-0. Phosphate.
 Kenderdine Ammoniated Phosphate.
 Kenderdine Nitrate of Soda.

KEYSTONE BONE FERTILIZER COMPANY, PHILADELPHIA, PA.

1916 Keystone Economy Grain Compound.
 1916 Keystone Special Penna. Grain Mixture.
 1916 Keystone Ammoniated Superphosphate.
 1916 Keystone Grain & Grass Manure.
 1916 Keystone General Manure.
 1916 Keystone Royal Corn & Potato Manure.
 1916 Keystone Standard Potato Manure.
 1916 Keystone Corn & Cereal Grower.
 1916 Keystone Extra Potato Manure.
 1916 Keystone Spureme Potato & Truck Manure.
 Keystone 14 Per Cent. Acid Phosphate.

FOR KEYSTONE GRANGE EXCHANGE, MANSFIELD, PA.

Grangers Brand.
 Grangers Choice.
 Grangers Special Crop Grower.
 Grangers Emergency Compound.
 Grangers Best Mixture.
 16 Per Cent. Acid Phosphate.

KIRKE CHEMICAL CO., INC., BROOKLYN, N. Y.

Kirke Fertilizer.

THE LANCASTER BONE FERTILIZER CO., LANCASTER, PA.

Potato, Tobacco and Truck Manure.
 Scientific Organic Compound.
 Potato, Fruit and Vegetable.
 Lancaster Favorite.
 Corn, Grass and Wheat Special.
 Ammoniated Bone Manure.
 Special Guano.
 Keystone Standard.
 National Crop Grower.
 Grange Special.

THE LANCASTER CHEMICAL COMPANY, LANCASTER, PA.

No. 1 Tobacco and Vegetable.
 No. 2 Dewey Brand.
 No. 3 Dissolved Animal Bone and Potash.
 No. 4 Rising Sun.
 No. 5 Flag Brand.
 No. 6 Grain Special.
 No. 8 Acid Phosphate.
 No. 9 Bone Meal.
 No. 10 Economist.
 No. 11 Keystone Brand.
 No. 14 Wheat and Grass.
 No. 15 General Crop Special.
 No. 16 Phosphoric Acid Special.
 No. 17 Wrapper Leaf Special.
 No. 18 Success Brand.
 No. 19 Potato Special.

**LEBANON FERTILIZER WORKS, HARRY D. LEVAN, PROPRIETOR,
LEBANON, PA.**

Levan's Special Corn Fertilizer.
 Levan's General Crop Grower Fertilizer.
 Levan's Potato & Tobacco Fertilizer.
 Levan's Grain Grower Fertilizer.
 Levan's Acid Phosphate.
 Levan's Pure Fine Ground Bone Meal.
 Levan's Animal Tankage.

LISTERS AGRICULTURAL CHEMICAL WORKS, NEWARK, N. J

Listers Pennsylvania Special 1916.
 Listers Reliance 1916.
 Listers Standard Pure Superphosphate of Lime 1916.
 Listers Potato Manure 1916.
 Listers Potato & Corn No. 2 Fertilizer 1916.
 Listers Cauliflower & Cabbage Fertilizer 1916.
 Listers Ammoniated Dissolved Superphosphate 1916.
 Listers Vegetable Compound 1916.
 Listers Success Fertilizer 1916.
 Listers Special Wheat Fertilizer 1916.
 Listers Wheat & Rye Fertilizer 1916.
 Listers High Grade Grain Grower 1916.
 Listers Valley Brand Fertilizer 1916.
 Listers Harvest Queen Phosphate 1916.
 Listers Special Tobacco Fertilizer 1916.
 Listers Lawn Fertilizer 1916.
 Listers Special Crop Producer 1916.
 Listers U S Superphosphate 1916.
 Listers Buyer's Choice Acid Phosphate.
 Listers Golden Sheaf 1916.
 Listers New York Special Fertilizer 1916.
 Listers Corn & Potato Fertilizer 1916.
 Listers High Grade Acid Phosphate.
 Listers Squirrel Brand Fertilizer 1916.
 Listers Plant Food 1916.
 Listers Crescent Ammoniated Superphosphate 1916.
 Listers Excelsior Guano 1916.
 Listers Superior Ammoniated Superphosphate 1916.
 Listers Atlas Brand Fertilizer 1916.
 Listers Bone Meal 1916.
 Listers Celebrated Ground Bone & Tankage Acidulated.

FREDERICK LUDLAM CO., NEW YORK CITY.

Ludlam's Cecrops Fertilizer Dissolved Phosphate.
 Ludlam's Cecrops Fertilizer High Grade Dissolved Phosphate.
 Ludlam's Cecrops Fertilizer C. & G. Brand 1916.
 Ludlam's Cecrops Fertilizer No. 2 for Grain & Grass.
 Ludlam's Cecrops Fertilizer Harvest Queen 1916.
 Ludlam's Cecrops Fertilizer All Crop Fertilizer 1916.
 Ludlam's Cecrops Fertilizer A B F Brand 1916.
 Ludlam's Cecrops Fertilizer Special Guano 1916.
 Ludlam's Sickle Fertilizer No. 1, 1916.
 Ludlam's Sickle Fertilizer No. 2, 1916.
 Ludlam's Sickle Fertilizer No. 3, 1916.

THE MAPES FORMULA & PERUVIAN GUANO CO., NEW YORK CITY.

Mapes Potato Manure (War Brand).
 Mapes Tobacco Starter Improved.
 Mapes Tobacco Manure (War Brand).
 Mapes General Special (War Brand).
 Mapes Top Dresser Full Strength (War Brand)

Mapes Top Dresser Half Strength (War Brand).
 Mapes Corn Manure (War Brand).
 Mapes Cereal Brand (War Special).
 Mapes General Crop (War Special).

MARTIN FERTILIZER CO., PHILADELPHIA, PA

Martin's Early Truck & Vegetable Grower.
 Martin's Bull Head Fertilizer.
 Martin's Corn & Cereal Special.
 Martin's Dissolved Organic Compound.
 Martin's Sure Grower.
 Martin's Crop Producer.
 Martin's Pure Raw Bone Meal.
 Martin's Pure Ground Bone.
 Martin's Pure Dissolved Animal Matter.
 Martin's Acid Phosphate.
 Martin's Ammoniated Phosphate.

HENRY F. MICHELL CO., PHILADELPHIA, PA.

Michell's High Grade Ammoniated Phosphate.
 Pure Raw Bone Meal Special Grade.
 Hi-Grade Potato Phosphate.
 Michell's Fine Ground Bone Meal.

THE MILLER FERTILIZER COMPANY, BALTIMORE, MD.

Standard Phosphate.
 Ammoniated.
 Harvest Queen.
 M. B. S.
 Hustler Phosphate.
 Club Brand.
 W. G. Phosphate.
 Farmers Profit.
 Pimlico.
 Potato & Vegetable Grower.
 Acid Phosphate 14 Per Cent.
 Ground Bone.
 Special Tobacco Grower.
 Millers No. 1 Special.
 Millers No. 2 Special.
 Pure Dissolved Bone.

MT. PLEASANT FERTILIZER COMPANY, MT. PLEASANT, TENN.

Fine Ground Phosphate Rock.

NASSAU FERTILIZER COMPANY, NEW YORK CITY.

Soluble Phosphate.
 High Grade Superphosphate.
 Old Hickory 1916.
 Common Sense Fertilizer 1916.
 Ammoniated Potato Compound.

Ammoniated Truck Producer.
 Wheat & Grass Grower 1916.
 Special Mixture 1916.
 General Favorite 1916.
 Plow Brand 1916.
 Big Yield 1916.
 Potato Manure 1916.
 Nassau Special 1916.
 Gladiator Truck & Potato 1916.

NEW YORK STABLE MANURE CO., JERSEY CITY, N. J.

Diamond Brand—Dried Ground Compost.

NITRATE AGENCIES COMPANY, NEW YORK CITY.

High Grade Acid Phosphate 16 Per Cent.
 High Grade Acid Phosphate 14 Per Cent.
 Dried Blood 16 Per Cent.
 Ground Tankage 7-15 Per Cent.
 Ground Bone 3-50 Per Cent.
 High Grade Genuine Peruvian Guano.
 Nitrate of Soda.
 Pescadores High Grade Genuine Peruvian Guano.
 High Grade Ground Fish.

NORTHWAY & PECK, EAST ORWELL, OHIO.

16 Per Cent. Available Phosphoric Acid.

G. OBER & SONS CO., BALTIMORE, MD.

Obers Sun Beam Guano.
 Obers Electro Compound.
 Obers Star Vegetable Compound.
 Obers Red King Guano.
 Nitro Potash Compound.
 Independent Ammoniated Phosphate.
 Dissolved Phosphate 14 Per Cent.

**ODORLESS EXCAVATING & MANUFACTURING CO., JOSEPH SMITH
 TRADING AS THE, GERMANTOWN, PHILADELPHIA, PA.**

Poudrette.

OXFORD PACKING WORKS, OXFORD, PA.

O. P. W. No. 1.
 O. P. W. No. 2.

OYLER & SPANGLER, GETTYSBURG, PA.

Special.
 Gettysburg.

PATAPSCO GUANO CO., BALTIMORE, MD.

Patapsco Hay Maker.
 Patapsco Special Early Trucker 1916.
 Patapsco Timothy & Clover Top Dressing 1916.
 Patapsco Prolific Potato Phosphate 1916.
 Patapsco Columbian Guano for Truck, Potatoes & Tobacco 1916.
 Patapsco Guano 1916.
 Patapsco Tobacco & Potato Fertilizer 1916.
 Patapsco Special Potato Manure 1916.
 Grange Mixture 1916.
 Planters Favorite 1916.
 Patapsco Corn & Tomato Fertilizer 1916.
 Coon Brand Guano 1916.
 Patapsco Money Maker 1916.
 Sea Gull Guano.
 Patapsco General Crop Producer.
 Patapsco B. B. & P. Brand 1916.
 Patapsco Golden Crop Fertilizer 1916.
 Patapsco Ammoniated Compound.
 Patapsco Dissolved Phosphate.
 Patapsco High Grade Acid Phosphate.
 Patapsco Pure Dissolved S. C. Phosphate.

PIEDMONT-MT. AIRY GUANO CO., BALTIMORE, MD.

Piedmont 14 Per Cent. Acid Phosphate.
 Piedmont 16 Per Cent. Acid Phosphate.
 Piedmont Special Crop Grower.
 Piedmont Utility Fertilizer.

PITTSBURGH PROVISION & PACKING COMPANY, PITTSBURGH, PA

No. 1 Pure Raw Bone Meal.
 Pure Raw Bone Meal.
 Crescent Butchers' Ground Bone.
 Pure Bone & Meat.
 Keystone Fertilizer.
 Lawn Fertilizer.
 Guano Fertilizer.
 Acid Phosphate.
 Nitrate of Soda.
 Pure Bone with Potash.
 Pure Bone without Potash.
 Smiths' Grower, manufactured for A. W. Smith Co., Pittsburgh, Pa.

**THE POLLOCK FERTILIZER CO., By The American Agricultural Chemical Co.
BALTIMORE, MD.**

The Pollock Fertilizer Co. Dissolved S. C. Phosphate.
 The Pollock Fertilizer Co. High Grade Super Phosphate.
 The Pollock Fertilizer Co. Corn & Oats Special 1916.
 The Pollock Fertilizer Co. Corn, Wheat & Tomato Guano 1916.
 The Pollock Fertilizer Co. Ammoniated Super Phosphate 1916.
 The Pollock Fertilizer Co. Special Potato & Tobacco Fertilizer 1916.
 The Pollock Fertilizer Co. Ammoniated Fertilizer A.
 The Pollock Fertilizer Co. Ammoniated Fertilizer AA.
 The Pollock Fertilizer Co. Ammoniated Fertilizer AAA.

PUGH & LYONS, OXFORD, PA.

Ground Raw Bone.

B. R. P. Phosphate.

RASIN-MONUMENTAL CO., BALTIMORE, MD.

Rasin's Potato & Vegetable Ammoniated Super Phosphate.

Rasin's Matchless Ammoniated Phosphate.

Rasin's Special Fish & Bone Guano.

Rasin's Special Crop Preparation.

Rasin's United Grain Ammoniated Super Phosphate.

Rasin's Grain & Grass Ammoniated Super Phosphate.

Rasin's Royal Ammoniated Super Phosphate.

Rasin's Half & Half Special.

Rasin's Empire Complete Compound.

Rasin's Home Run Guano Revised.

Rasin's Emergency Royal Fish Bone & Potash.

Rasin's Seawall Grain Compound.

Rasin's Capitol Crop Compound Revised.

Rasin's Royal Manure.

Rasin's Empire Guano.

Rasin's 16 Per Cent. Acid Phosphate.

Rasin's Acid Phosphate.

Rasin's Seawall Special.

Wm. Penn Crop Grower.

READING BONE FERTILIZER COMPANY, READING, PA.

High Grade Truck Food.

Truck, Fruit, Tree, Vine, Potato & Tobacco Grower.

Reading Soil Enricher.

Reading Prize Winner.

Tobacco & Truck Special.

Reading All Crop Special.

Animal Tankage Mixture.

Reading Harvest Queen.

Reading Special Potato & Tobacco Manure.

Never Fail Crop Grower.

Dissolved Animal Matter.

Reading Special Grain & Grass Producer.

Schuylkill Valley Favorite.

16 Per Cent. Acid Phosphate.

Soluble Dissolved Phosphate.

Pure Raw Bone.

Pure Bone Meal.

Nitrate of Soda.

READING CHEMICAL CO., READING, PA.

Reading Grain Special.

Farmers Meat & Potash Mixture.

Farmers Favorite.

Reading Big Crop Special.

Reading Soil Builder.

Pennant Winner.
 Early Truck, Tobacco & Potato.
 High Grade Phosphate.
 Reading Clear Acid Phosphate.

ROBERT A. REICHARD, ALLENTOWN, PA

Special Manure.
 Raw Bone Meal.
 Steamed Bone Meal.
 Surpass Phosphate.
 Gilt Edge Phosphate.
 Farmers' Choice Phosphate.
 American Eagle Phosphate.
 Acid Phosphate.

F. S. ROYSTER GUANO CO., BALTIMORE, MD.

Royster's 14 Per Cent. Acid Phosphate.
 Royster's H. G. 16 Per Cent. Acid Phosphate.
 Royster's Royal Blue Ammoniated Superphosphate.
 Royster's Penguin Ammoniated Superphosphate.
 Royster's Flamingo Ammoniated Superphosphate.
 Royster's Curfew Ammoniated Superphosphate.
 Royster's Cuckoo Crop Grower.
 Royster's Logical Compound.
 Royster's Old Faithful Phosphate.
 Royster's Drillwell Phosphate.
 Royster's Defender Fertilizer.
 Royster's Pure Raw Bone Meal.
 Royster's Fine Ground Bone Meal.
 Nitrate of Soda.

SCHAAL-SHELDON FERTILIZER CO., BUFFALO, N. Y.

Dissolved Phosphate.
 Soluble Phosphate.
 Ammoniated Superphosphate No. 1.
 Ammoniated Superphosphate No. 2.
 Ammoniated Superphosphate No. 3.
 Ammoniated Superphosphate No. 4.
 Farmers' Favorite 1916.
 Guano 1916.
 Grass, Wheat & Oats 1916.
 Schaal's Standard 1916.
 Schaal's Corn & Potato 1916.
 General Fertilizer 1916.
 Truckers' Manure 1916.
 Eureka 1916.
 Excelsior 1916.

THE SCOTT FERTILIZER COMPANY, ELKTON, MD.

Scott's Sure Growth Compound.
 Scott's Potato Grower.
 Scott's Sure Growth Superphosphate.
 Scott's Potato & Truck.
 Scott's Ammoniated Superphosphate.
 Scott's Ammoniated Base.
 Scott's Special Grain Grower.
 Scott's Pure Ground Raw Bone.
 Scott's Tip Top Soluble Phosphate.

SHARON RENDERING & FERTILIZER WORKS, SHARON, PA

Enterprise Phosphate.
 Glue Phosphate.
 16 Per Cent. Acid Phosphate.

M. L. SHOEMAKER & CO., LTD., PHILADELPHIA, PA.

Swift-Sure Super Phosphate for Tobacco and General Use.
 Swift-Sure Guano for Tomatoes, Truck & Corn.
 Echo Super Phosphate.
 Swift-Sure Bone Meal.
 Shoemaker's Pure Raw Bone Meal.

F. A. SIMONS BROS., CORNWELLS, PA.

The Farmers Favorite High Grade Phosphate for Truck and Corn.

SMITH AGRICULTURAL CHEMICAL CO., COLUMBUS, OHIO.

Smith's General Crop Fertilizer.
 Smith's Corn, Oats & Wheat Fertilizer.
 Smith's Ammoniated Phosphate & Potash.
 Smith's Wheat Maker Seeding Down.
 Smith's 16 Per Cent. Acid Phosphate.
 Smith's Ground Bone.

THE SOUTHERN FERTILIZING CO., by The American Agricultural Chemical Co., YORK PA.

Southern Fertilizing Co. Dissolved Phosphate.
 Southern Fertilizing Co. High Grade Super Phosphate.
 Southern Fertilizing Co. General Crop Grower 1916.
 Southern Fertilizing Co. Farmers Choice Brand 1916.
 Southern Fertilizing Co. Special Potato Grower 1916.
 Southern Fertilizing Co. Wheat, Corn & Grass Grower 1916.
 Southern Fertilizing Co. Queen of the Harvest 1916.
 Southern Fertilizing Co. Ammoniated Dissolved Fertilizer 1916.

SWACK'S FERTILIZER WORKS, INC., DUBOIS, PA.

Swack's Grain & Corn.
 Swack's General Crop Grower.
 Swack's Wheat.
 Swack's Potato & Truck.
 Swack's Special Potato.

Swack's Corn Special.
 Swack's Grain Grower.
 Swack's High Grade Tankage.
 Swack's Acid Phosphate 16 Per Cent
 Swack's Acid Phosphate 14 Per Cent.
 Swack's Lime Phosphate & Potash.

I. P. THOMAS & SON CO., PHILADELPHIA, PA.

Tip Top Fertilizer.
 Farmers Choice Fertilizer.
 Champion Phosphate.
 Normal Fertilizer.
 Victor Potash Fertilizer.
 Thomas Wheat & Corn Fertilizer.
 Thomas 1 Per Cent. Organic Fertilizer.
 Truckers High Grade Manure.
 Fish Guano.
 Thomas 4 Per Cent. Organic Fertilizer.
 Improved Fertilizer.
 Superior Super Phosphate.
 16 Per Cent. Acid Phosphate.
 S. C. Phosphate.
 Pure Ground Bone.
 Nitrate Soda.

J. M. TEMPLIN, HONEYBROOK, PA.

No. 6 Phosphoric Acid Special.
 No. 4 Atlas Brand.

TRENTON BONE FERTILIZER COMPANY, TRENTON, N. J.

Bone & Tankage.
 4-8 Potato.
 4-10 Potato.
 Sweet Potato & Corn.
 Special Grain.
 Oats Mixture.
 Pure Fine Ground Bones.

F. W. TUNNEL & COMPANY, INC., PHILADELPHIA, PA.

1916 Lightning Guano.
 1916 No. 1 Potato & Truck Manure.
 1916 No. 2 Potato & Truck Manure.
 1916 Potato & Vegetable Manure.
 1916 Fish Manure.
 Wheat Grower.
 1916 Excelsior Phosphate.
 1916 Raw & Acidulated Animal Compound.
 Pure Ground Bone.

JACOB TRINLEY & SONS, LINFIELD, PA.

Pure Raw Bone Meal.
 Favorite Phosphate.
 Grain & Grass Grower.
 Special Potato Manure.
 Acid Phosphate.

TUSCARORA FERTILIZER CO., BALTIMORE, MD.

Acid Phosphate 14 Per Cent.
 Acid Phosphate 16 Per Cent.
 Tuscarora's (1½-9-0).
 Tuscarora's (2-11-0).
 Ammoniated Phosphate 1-7-1.
 Standard 2-8-2.
 Tuscarora's (2-8-1).
 Tuscarora's (3-8-1).
 Nitrate of Soda 18 Per Cent.
 Animal Bone 3-22.

THE J. E. TYGERT CO., By The American Agricultural Chemical Co., PHILA-DELPHIA, PA.

14 Per Cent Acid Phosphate.
 16 Per Cent. Acid Phosphate.
 18 Per Cent. Phosphate.
 Ammoniated Fertilizer A.
 Ammoniated Fertilizer AA.
 Prolific Phosphate 1916.
 Popular Phosphate.
 Golden Harvest Phosphate 1916.
 Quaker Special Fertilizer 1916.
 Standard Fertilizer 1916.
 Vegetable & Corn Fertilizer 1916.
 Old Reliable Phosphate 1916.
 Special Potato & Tomato Guano 1916.
 Premium Manure 1916.
 Early Truck Guano 1916.
 Paramount Potato & Truck Manure 1916.
 High Grade Special Fertilizer.
 Beacon Brand.

UNION CHEMICAL WORKS, INC., NORTH WALES, PA.

Raw Bone Meal.
 Bone Meal.
 Eastern Trucker.
 Animal Bone with Potash.
 Farmers' Favorite.
 Three Ten Mixture.
 Two Ten Mixture.
 Two Eight Mixture.
 Acid Phosphate.
 Nitrate of Soda.
 Ground Tankage 6 & 20.
 Ground Tankage 10 & 15.

**VIRGINIA-CAROLINA CHEMICAL CO. for resale by Rasin-Monumental Co.,
BALTIMORE, MD.**

V. C. C. Co. Truck & Vegetable Super Phosphate.
V. C. C. Co. Royal Ammoniated Guano.
V. C. C. Co. Fish & Bone Mixture.
V. C. C. Co. Special Crop Formula.
V. C. C. Co. Ammoniated Special.
V. C. C. Co. Electric Ammoniated Super Phosphate.
V. C. C. Co. Star Crop Producer.
V. C. C. Co. Eureka Complete Guano Revised.
V. C. C. Co. Fish Bone & Potash Revised.
V. C. C. Co. Comet Grain Grower.
V. C. C. Co. Special Compound for Wheat.
V. C. C. Co. Champion Manure.
V. C. C. Co. 16 Per Cent. Acid Phosphate.
V. C. C. Co. 14 Per Cent. Acid Phosphate.
V. C. C. Co. Royal Acid Phosphate.
V. C. C. Co. Standard Crop Grower.

EMIL WALH MANUFACTURING CO., PHILADELPHIA, PA.

Emil Wahl's Warranted Pure Philadelphia Button Bone Meal.

ABRAHAM WALTERMYER, STEWARTSTOWN, PA.

Grain & Grass Grower.
Crop Grower.

**FOR W. E. WHANN CO., By The American Agricultural Chemical Co., PHILA-
DELPHIA, PA.**

Whann's Chester Valley No. 2 Ammoniated Superphosphate 1916.
Whann's Chester Valley Fish & Potash Fertilizer 1916.
Whann's Chester Valley Potato & Truck Special 1916.
Whann's Chester Valley Special Potato & Truck Fertilizer 1916.
Whann's Chester Valley High Grade Truck Manure 1916.
Whann's Chester Valley Cabbage & Cauliflower Manure 1916.
Whann's Chester Valley Nitrate Mixture for Top Dressing 1916.
Whann's Chester Valley Special Ammoniated Superphosphate 1916.
Whann's Chester Valley Available Ammoniated Superphosphate 1916.

WITHERBEE, SHERMAN & CO., PORT HENRY, N. Y.

Barium-Phosphate.

THE ROBERT A. WOOLDRIDGE CO., BALTIMORE, MD.

Wooldridge's Florida Acid Phosphate.
Wooldridge's High Grade Acid Phosphate.
Wooldridge's Farmer's Favorite Cereal Compound 1916.
Wooldridge's Ammoniated Phosphate.
Wooldridge's Champion Stag Phosphate 1916.
Wooldridge's Old Fidelity Phosphate.
Wooldridge's Common Sense Super-Phosphate.
Wooldridge's Triumph Brand Phosphate 1916.
Wooldridge's Chieftain Phosphate 1916.
Wooldridge's Special Potato & Tobacco Fertilizer 1916.
Wooldridge's Double Quick Phosphate 1916.
Wooldridge's High Grade Ammoniated Potash Fertilizer 1916.

THE WOOLDRIDGE FERTILIZER COMPANY, BALTIMORE, MD

Wooldridge' Special No. 1.
 Tiger Phosphate.
 Old Hickory Phosphate.
 Clover Leaf Crop Grower.

YORK CHEMICAL WORKS, YORK, PA.

Dempwolf's Raw Bone Meal.
 Dempwolf's Pure Ground Bone.
 Dempwolf's Dissolved Animal Bone.
 Dempwolf's Top Dresser.
 Dempwolf's Early Trucker.
 Dempwolf's Potato & Truck.
 Dempwolf's Spring Special.
 Dempwolf's Corn & Oats.
 Dempwolf's R. B. Special.
 Dempwolf's Royal Mixture.
 Dempwolf's Red Cross.
 Dempwolf's Crop Grower.
 Dempwolf's Codorus Brand.
 Dempwolf's Prosperity.
 Dempwolf's Black Cross.
 Dempwolf's Two-Eight-One.
 Dempwolf's Plow Brand.
 Dempwolf's Harvest Queen.
 Dempwolf's Half & Half.
 Dempwolf's York Special.
 Dempwolf's Dauphin Brand.
 Dempwolf's Golden Sheaf.
 Dempwolf's Superphosphate.
 Dempwolf's Dissolved Phosphate.
 Dempwolf's High Grade Tankage.
 Nitrate of Soda.

THE C. A. YOUNG CO., JOHNSTOWN, PA.

B. B. Brand Packing House Fertilizer.

LIST OF LIME PRODUCERS AND BRANDS OF THEIR PRODUCTS FOR WHICH LICENSE TO SELL IN PENNSYLVANIA DURING 1916 WAS TAKEN OUT PRIOR TO AND INCLUDING FEBRUARY 21, 1916.

ACME PULVERIZING AND STONE CO., LTD., LEBANON, PA.

B. B. Brand Ground Limestone.

ALMEDIA QUARRY CO., ALMEDIA, PA.

Fresh Burned Run of Kiln Lump Lime.

THE AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK CITY

Superior Agricultural Lime.

Fine Ground Nova Scotia Plaster.

AMERICAN LIME & STONE COMPANY, TYRONE, PA.

No. 1 Agricultural Lime.

No. 2 Agricultural Lime.

Forkings.

Agricultural Ground Lime.

Hydra-Oxide of Lime for Agricultural Use.

Agricultural Ground Limestone 12 x 24 wire.

T. N. ARTLEY, MUNCY, PA. R. No. 2.

Freshly Burned Lump Lime.

F. M. BAKER, HUEFNER, PA.

Burned Ground Lime.

J. E. BAKER CO., YORK, PA.

Victor Ground Limestone.

Victor Fine Ground Burned Lime.

Victor Burned Lump Lime.

Empire Burned Lump Lime.

Empire Slaked Lime.

BEAVER VALLEY LIME CO., ELLWOOD CITY, PA.

Beaver Lump Lime.

Beaver Ground Lime.

Beaver Hydrated Lime.

BESSEMER LIMESTONE COMPANY, YOUNGSTOWN, OHIO.

Bessemer Pulverized Limestone.

BLAIR LIMESTONE CO., MARTINSBURG, W. VA.

Lime Screenings.

Opequon Hydrated Lime.

Martinsburg Granulated Lime.

J. G. BOWER, MONTTOURSVILLE, PA.

"Bluestone" Lump Lime

WALTER T. BRADLEY, PHILADELPHIA, PA

Lump Lime.

W. M. BULL, MUNCY, PA. R. No. 2.

Freshly Burned Lump Lime.

JOHN T. BURKET, HYNDMAN, PA.

Peerless.

THE CARBON LIMESTONE CO., YOUNGSTOWN, OHIO

Carbon Limestone.

CENTRE COUNTY LIME CO., BELLEFONTE, PA.

Pure Hydrated Drilling Lime.

Agricultural Lime.

CLIMAX LIME & STONE COMPANY, WICK, PA.

Lump Lime.

Ground Burned Lime.

Hydrated Lime.

CLYDESDALE BRICK & STONE CO., PITTSBURGH, PA.

Pulverized Agricultural Limestone.

THE COLUMBIA PRODUCTS COMPANY, CLEVELAND, OHIO.

Plant Lime, Manufactured Carbonate.

F. E. CONLEY LIME & FERTILIZER CO., UTICA, N. Y.

Raw Ground Lime (Ground Limestone).

CONNEAUT LAKE MARL CO., HARMONSBURG, PA.

Conneaut Marl-Lime.

CORNWALL ORE BANK COMPANY, CORNWALL, PA.

Cornwall.

G. & W. H. CORSON, PLYMOUTH MEETING, PA.

Corson's Prepared Lime (Hydrated).

Ground Lime.

Run of Kiln Lime.

Fine Lime (Partially Slaked Refuse Lime).

CRESENT PORTLAND CEMENT CO., WAMPUM, PA.

Ground Lime.
Lump Lime.
Hydrated Lime.

DIETRICK BROTHERS, READING, PA.

Dietrick's Medal Brand Hydrated Lime.

EMIG LIME CO., HELLAM, PA.

Emig Agricultural Lime.

THE ENTERPRISE LIME & BALLAST CO., HYNDMAN, PA.

Lump Lime (Run of the Kilns).
Granulated Lime. (Sacked).

THE FRANKLIN MFG. CO., STONEBORO, PA.

Franklin Brand.

GROVE CITY LESTONE CO., GROVE CITY, PA.

Burnt Lump Lime.
Burnt Ground Lime.
Hydrated Lime (Clover Brand).

M. J. GROVE LIME CO., LIME KILN, MD.

Famous Frederick County Agricultural Lime.
Pulverized Limestone.

CHAS. BURDETT HART, LANCASTER, PA.

"Calcarb" (Pulveried Limestone).

INDUSTRIAL CHEMICAL CO., NEW YORK CITY.

I. C. Co. Precipitated Agricultural Lime.

**INTERNATIONAL AGRICULTURAL CORPORATION—CALEDONIA MARL
BRANCH, BUFFALO, N. Y.**

Lime Carbonate—Marl.

G. W. JOHNSON LESTONE CO., NEW CASTLE, PA.

Johnson's Pulverized Limestone.

KEASBEY & MATTISON COMPANY, AMBLER, PA.

Agricultural Lime (Artificial Carbonate of Lime).

LUTHER KELLER, SCRANTON, PA.

Keller Lump Lime.

THE KELLEY ISLAND LIME & TRANSPORT CO., CLEVELAND, OHIO.

Tiger Brand Agricultural Hydrated Lime.
 Tiger Brand Agricultural Ground Quicklime.
 Tiger Brand Agricultural Ground Limestone.

THE KEYSTONE PLASTER CO., CHESTER, PA.

Land Plaster (Gypsum).

SAMUEL KIEHL, URBAN, PA.

Lime.

HENRY KILGUS, MUNCY, PA., R. NO. 5.

Freshly Burned Lump Lime.

KNICKERBOCKER LIME COMPANY, PHILADELPHIA, PA.

Hydrated Lime.
 Ground Lime.
 Run of Kiln Lime.
 Ground Limestone.

L. F. KOCH, MONTTOURSVILLE, PA.

"Verigood" Lime.

LANDIS STONE MEAL CO., RHEEMS, PA.

Landis Stone Meal.

E. J. LAVINO & CO., PHILADELPHIA, PA.

"White Marsh" Pulverized Limestone.

S. H. LENHART SONS, WEST LEESPORT, PA.

Bulk Lime.

E. W. LIGHT, HYDNMAN, PA.

Lump Lime (Run of the Kilns).

LOW BROTHER & CO., LIME RIDGE, PA.

Standard Grade A. Run of Kiln Lime.
 Selected Grade B. Run of Kiln Lime.

MERION LIME & STONE COMPANY, NORRISTOWN, PA.

Hydrated Lime.
 Run of Kiln.
 Ground Fresh Lime.

GEO. P. MILLER, Doing Business as SHIKELIMO LIME COMPANY, LEWISBURG, PA.

Shikelimo Agricultural Lime.

MOUNT UNION LIME CO., MOUNT UNION, PA.

Agricultural Lime-Run of Kiln.

MYERS & PECK, DUNCANSVILLE, PA.

Agricultural Lime.

W. E. McCONNELL, HUGHESVILLE, PA.

Freshly Burned Lump Lime.

NEW CASTLE LIME, BRICK & SUPPLY CO., NEW CASTLE, PA.

Hydrated Lime.

Burnt Lump Lime.

Ground Burned Lime.

NORTHERN CENTRAL LIME COMPANY, WILLIAMSPORT, PA.

LYCO Agricultural Lump Lime.

LYCO Agricultural Hydrated Lime.

NORWICH CHEMICAL CO., EAST SMETHPORT, PA.

Norwich Carbonate of Lime.

OHIO FARMERS LIME CO., CLEVELAND, OHIO.

Ohio Farmers Lime.

THE OHIO & WESTERN LIME CO., HUNTINGTON, IND.

Ground Quick Agricultural Lime.

Hydrated Agricultural Lime.

THE PALMER LIME & CEMENT CO., NEW YORK CITY.

Challenge Brand Hydrated Lime.

Ground Limestone.

Snow Flake Hydrated Lime.

THE PARAGON PLASTER AND SUPPLY CO., BLOOMSBURG, PA.

Paragon Hydrated Lime.

W. L. PARTNER & SON, MIFFLIN, PA.

Partner's Burnt Ground Lime.

PHILADELPHIA LIME COMPANY, INC., PHILADELPHIA, PA.

Hydrated Lime.

M. H. REEDER, MUNCY, PA.

Freshly Burned Chippewa Lump Lime.

ROSE POINT STONE & LIME CO., NEW CASTLE, PA.

Peerless Hydrated Lime.
 Rose Point Hydrated Lime.
 Rose Point Ground Burned Lime.
 Rose Point Burned Lump Lime.

MARSHALL RUTHERFORD, HARRISBURG, PA.

Beaver Creek-Ground Lime.
 Beaver Creek-Lump Lime.

RUTHERFORD BROTHERS, PAXTANG, PA.

Run of Kiln Lime.

SECURITY CEMENT & LIME CO., HAGERSTOWN, MD.

Berkeley Hydrated Lime (Calcium and Magnesium Hydroxide 95 per cent.).
 Berkeley Ground Lime.
 Berkeley Ground Limestone (Carbonate of Lime 80 per cent.).

THE SCIOTO LIME & STONE CO., DELAWARE, OHIO.

"Clover Grower"—Hydrate.
 "Carbo Hydrate"—Lime Carbonate.

AARON SHAFFER, URBAN, PA.

Lime.

H. L. SHAFFER HIGH GRADE LIME CO., CRANBERRY, PA.

Lime.

SHEFFY AND ELLIOTT, ANNVILLE, PA.

Hydrated Agricultural Lime.
 Lump Lime.

SHENANGO LIMESTONE CO., LEETONIA, OHIO.

Shenango.

THE STANDARD LIME & STONE CO., BALTIMORE, MD.

Standard Finely Ground Limestone.
 Standard Coarse Ground Limestone.

THE STANDARD LIME & STONE COMPANY, BUCKEYSTOWN, MD.

Standard Lime.
 Standard Hydrated Lime.
 Ground Lime.

STEACY & WILTON COMPANY, WRIGHTSVILLE, PA.

"Sterling" Brand Hydrated Lime.
 Pulverized Fresh Burned Lime.
 Run-of-Kiln Agricultural Lime.
 Pulverized Limestone.

ISRAEL STETTLE, TREXLEERTOWN, PA.

Burned Lime.

BENJAMIN STONER, HELLAM, PA.

Empire Burned Lump Lime.

Empire Slaked Lime.

M. STUTZ, MONTTOURSVILLE, PA., R. F. D.

Montour Lime.

THOMASVILLE STONE & LIME CO., THOMASVILLE, PA.

Ground Limestone.

Lump Lime.

Ground Agricultural Lime (partly air slaked).

TIDEWATER PORTLAND CEMENT COMPANY, BALTIMORE, MD.

Tidewater Hydrated Lime.

Tidewater Lump Lime.

VANCE COMPANY, WINFIELD, PA.

Shoveled "Dry Valley" Lime.

Forked "Dry Valley" Lime.

CHARLES WARNER COMPANY, WILMINGTON, DEL.

Limoid (Hydrated Lime).

Pulverized Burnt Lime.

Pulverized Limestone Cedar Hollow.

Run-of-Kiln Lump Lime.

Pulverized Limestone McCoy.

Warner's 50-50 Lime.

GRANT M. WEIK, LEBANON, PA. R. NO. 5.

Lauber Lime.

WEST BRANCH LIME CO., WILLIAMSPORT, PA.

"Sussock" Lump Lime.

FRANK WILLIAMSON, PHILADELPHIA, PA.

Avondale Crushed Limestone NO. 20 MESH.

YORK VALLEY LIME COMPANY, YORK, PA.

York Valley Chemical Lime "Spraying."

York Valley Chemical Lime for Agricultural Purposes.

THE SOL. ZIMMERMAN FARMS & QUARRY, HIGHSPIRE, PA.

Zimmerman's Agricultural Lime.



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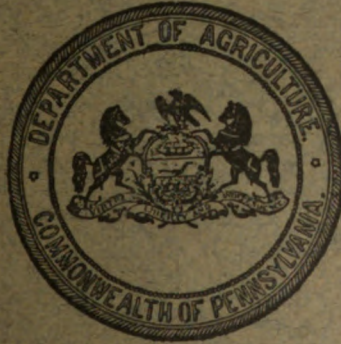
Pennsylvania
DEPARTMENT OF AGRICULTURE
BUREAU OF CHEMISTRY

BULLETIN NO. 276

SEED REPORT

1915

JAMES W. KELLOGG,
Chief Chemist



CHARLES E. PATTON, Secretary of Agriculture.

Published by Direction of The Secretary of Agriculture

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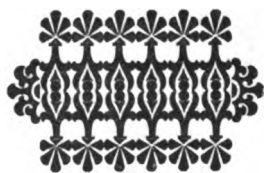
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LETTER OF TRANSMITTAL.

**DEPARTMENT OF AGRICULTURE.
BUREAU OF CHEMISTRY.**

Hon. Charles E. Patton, Harrisburg, Pa., Feb. 28, 1916.
Secretary of Agriculture,
Harrisburg, Pa.

Dear Sir: I have the honor to transmit herewith for your approval a report of the work performed by the Seed Laboratory of this Bureau during 1915 in testing Seeds for purity as provided for by the Seed Law. Five (5) plates illustrating one hundred noxious weed seeds found present in agricultural seeds were loaned the Department by the Seed Laboratory of the United States Department of Agriculture, and are included in this Report, for the purpose of assisting those interested in the identification of these foreign seeds.

It is recommended that this report be published in Bulletin form for distribution.

Respectfully yours,

JAMES W. KELLOGG,
Chief Chemist.



SEED REPORT

1915

JAMES W. KELLOGG HOWARD E. GENSLE

INTRODUCTION.

The work performed during the year in testing seeds for purity under the provisions of the seed law has been conducted in a similar manner as during the previous year and as shown in the Seed Report for 1914, Bulletin No. 258. The samples of seeds secured from dealers by Special Agents, and those submitted as special samples, were all examined by the Seed Analyst who, during a busy part of the season, was assisted by Ruth I. Mentzer. The testing of seeds for purity has been accomplished in a laboratory of this bureau especially arranged for this purpose. Since moving the laboratories to new quarters, better working facilities because of more light and space than was afforded in the former laboratories have greatly assisted in the work.

In order that the Department might cooperate with the seed inspection work being done in other States and by the U. S. Department of Agriculture, our Seed Analyst, representing the Department, attended the annual meeting of the Association of Official Seed Analysts of North America held in Columbus, Ohio, December 28th and 29th, 1915. Valuable information was secured as a result of the discussions of the various phases of the seed work. The results in connection with the co-operative work in testing for purity standard samples of seed, obtained by our Seed Analyst, were presented and showed that the work being done by the Department is carefully and accurately performed. The methods used in seed testing are uniform and are those approved by the above mentioned Association of Seed Analysts. The percentages of "Pure Seed," "Foreign Seed" and "Inert

Matter" are determined by weight as provided by the law. Pure seed including seeds of the sample in question, foreign seeds including all other seeds, noxious or which should not be present in the sample under examination and inert matter, all material other than pure seed or foreign seed and representing the dirt, stones, broken stems and less than halves of the seed being tested or of the foreign seeds.

In reporting the percentage of "Foreign Seed" when found present in large amounts, only those seeds are named which make up the greater portion of the foreign seeds and which are the principal cause of reducing the standard of purity. To name each kind of foreign seed present, including those which occur in relatively small amounts as well as those which make up the major part of the total percentage, would be misleading and of no particular value for the reason that these seeds which may be present in small amounts and make up only a small proportion of the whole amount are not the true cause of reducing the standard and may include many kinds. To include the names of and number of seeds present only in traces, therefore, would seem to indicate that these seeds were the cause of the trouble rather than one or two kinds which make up the greater part of the foreign seed which, of course, would be incorrect and confusing.

The official samples of seeds and the larger proportion of the special samples were received during the first part of the year, previous to the season of sowing. During the year seedsmen and consumers sent 235 special samples of seeds to be tested for purity, together with the fee of 25 cents which is charged, and, as speedily as possible, reports of the results secured were returned together with receipts for fees. These fees were paid to the State Treasurer from time to time, as required. The results secured on these special samples are shown by number only in Table No. 1 and are included in this report for the purpose of giving additional information as to the quality of seeds being grown and sold in the State. In many cases the samples were sent in to be tested to determine whether or not they should be cleaned to meet the standards of purity before being offered for sale. The results obtained showed that in a number of cases cleaning was necessary. As such samples did not represent the quality of the seeds finally offered for sale, the names of the parties submitting the same are not included in the Table.

The number of official samples of seeds secured by Special Agents from seedsmen and seed dealers in various localities of the State was 221. This number is possibly not as great as it should be to fairly represent the quality of the seeds being sold but, owing to the limited facilities for carrying on this work, a larger number of samples could not be examined. The purity tests on these samples, however, will indicate that the standards of purity established by the seed law are

complied with in most cases. It will be noted by referring to Table No. III, showing the results of inspection, that the number of samples which failed to meet the standards of purity was small. The results secured, together with the names or kind of seeds, names and addresses of seedmen and dealers from whom the samples were secured, are shown in this Table. As soon as possible after these tests were completed, reports were sent to the dealers from whom they were secured and the seedsmen or growers from whom the original purchase was made also received a report.

STANDARDS OF PURITY.

In order that the standards of purity established by the seed law may be at hand for ready reference, they are republished in this report ranging from 75% to 97% as follows:

Medium Red Clover,	<i>Trifolium pratense</i> ,	97 %.
Mammoth Red Clover,	<i>Trifolium pratense</i> ,	97 %.
Crimson Clover,	<i>Trifolium incarnatum</i> ,	97 %.
Alfalfa,	<i>Medicago sativa</i> ,	97 %.
Timothy-Grass,	<i>Phleum pratense</i> ,	97 %.
Barley,	<i>Hordeum vulgare</i> ,	97 %.
Spelt,	<i>Triticum aestivum</i> Spelta,	97 %.
Wheat,	<i>Triticum aestivum</i> ,	97 %.
Buckwheat,	<i>Fagopyrum Fagopyrum</i> ,	97 %.
Oats,	<i>Avena sativa</i> ,	97 %.
Rye,	<i>Secale cereale</i> ,	97 %.
Alsike Clover,	<i>Trifolium hybridum</i> ,	95 %.
Perennial Rye-Grass,	<i>Lolium perenne</i> ,	95 %.
German Millet,	<i>Chaetochloa italica</i> ,	95 %.
Hungarian Millet,	<i>Chaetochloa italica</i> ,	95 %.
White Clover,	<i>Trifolium repens</i> ,	90 %.
Redtop Grass,	<i>Agrostis alba</i> ,	85 %.
(solid or hulled).		
Canadian Blue-Grass,	<i>Poa compressa</i> ,	75 %.
Orchard Grass,	<i>Dactylis glomerata</i> ,	75 %.
Kentucky Blue-Grass,	<i>Poa pratensis</i> ,	75 %.
Redtop (unhulled),	<i>Agrostis alba</i> ,	75 %.

Dodder and Canada thistle are prohibited from being present in excess of 1 seed in 3,000.

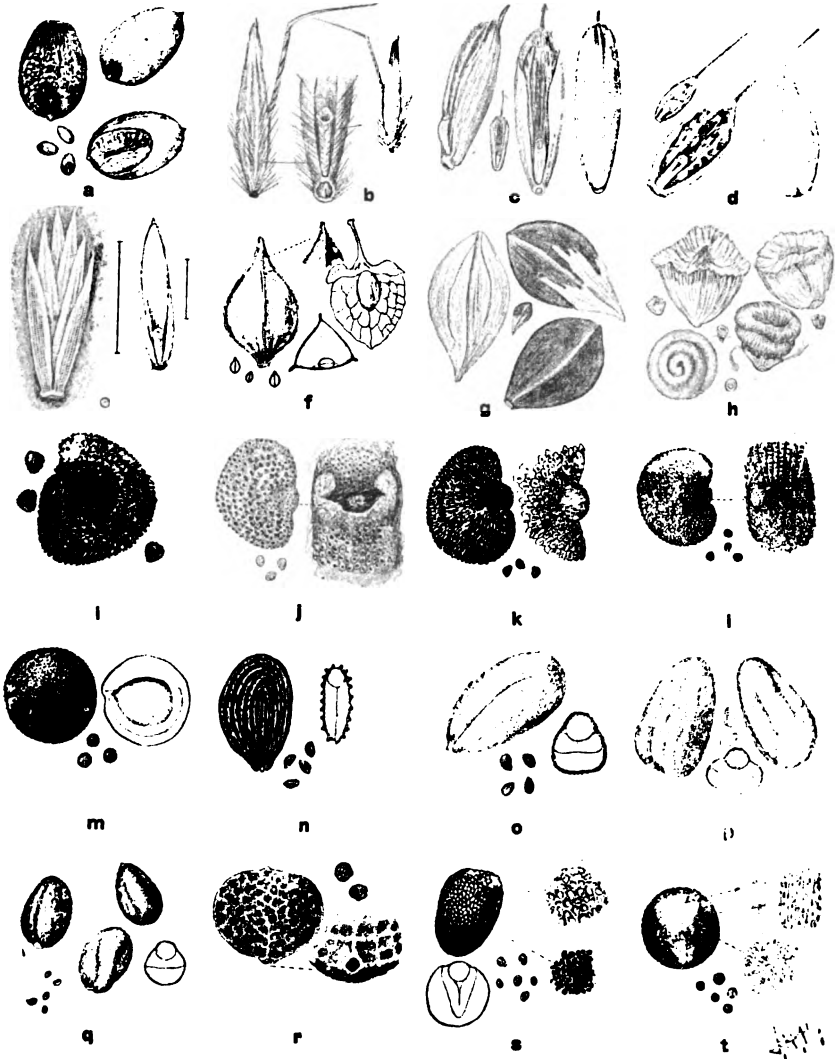
FOREIGN OR NOXIOUS WEED SEEDS.

Foreign and noxious weed seeds are frequently present in the various kinds of seeds in amounts sufficient to materially reduce the quality of these seeds and when sown propagate pernicious weeds which cause considerable damage to the crop. By sowing clean seeds, therefore, this danger can be largely overcome and the need of sowing clean seeds should be apparent to all. No effort should be spared

to make sure that the seeds purchased for sowing are of the highest quality in respect to freedom from noxious seeds as can be had. For a small fee the Department can advise any citizen of the State interested in this work, as to the character of the seed offered for sale, by testing special samples. If it is found that the sample of seed submitted for examination be impure, the shipment which it represents can be returned and acceptance refused. Those familiar with the general appearance of Agricultural seeds can easily detect the presence of foreign seeds, especially if they are present in sufficient amounts to substantially reduce the standard of seeds under examination. Unless one has had considerable experience and training, however, it is difficult to identify and separate these noxious seeds, as this work requires a trained Analyst. However, from illustrations of these weed seeds, by becoming familiar with their general appearance, those who purchase impure seeds will be able to identify the more common ones which are usually found present in farm seeds. Such illustrations, by giving the description of a seed, will often enable one to identify the plant from which it is obtained. The Botanist of the Seed Laboratory of the U. S. Department of Agriculture has permitted the Department to use and include in this report, five plates prepared by Prof. F. H. Hillman showing the characteristic appearance of 100 kinds of noxious and common weed seeds found in farm seeds. These illustrations which follow include a letter under each kind of seed and below each plate or figure will be found the corresponding common names or synonyms, botanical names and a brief description of each which has been prepared.

PLATE 1.—NOXIOUS WEED SEEDS FOUND IN FARM SEEDS.

(Loaned by Bureau of Plant Industry, U. S. Dept. of Ag.)

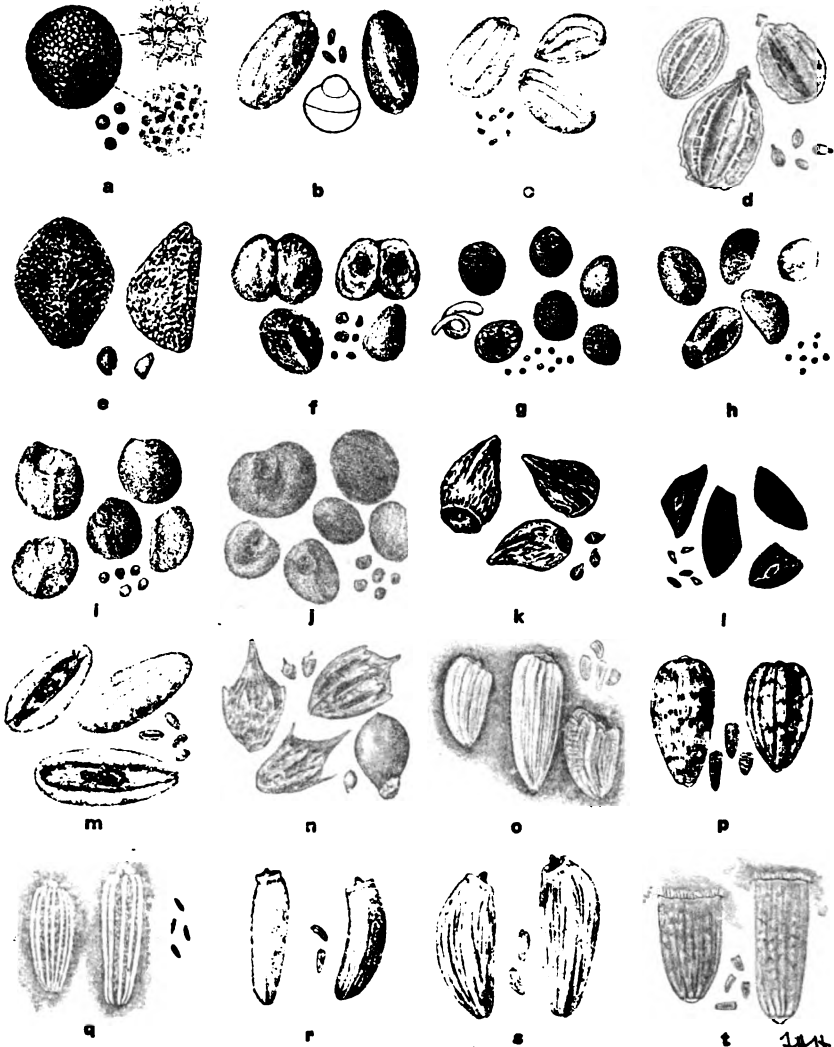


Common and Botanical Names. 1=Color. 2=Appearance Under Low-power Lens.

- a. Sandbur, *Cenchrus tribuloides*, (1) Light brown or straw, (2) Dull.
- b. Wild oat, *Avena fatua*, (1) Straw or brown, (2) Smooth.
- c. Chess or cheat, *Bromus secalinus*, (1) Straw, (2) Smooth.
- d. Darnel, *Lolium temulentum*, (1) Straw or brown, (2) Smooth; sometimes shiny.
- e. Quack-grass, *Agropyron repens*, (1) Light yellow, sometimes greenish, (2) Dull.
- f. Curled dock, *Rumex crispus*, (1) Reddish brown, (2) Smooth and shining.
- g. Black bindweed, *Polygonum convolvulus*, (1) Brown, straw or greenish in coat; out of coat, black and (2) somewhat shiny.
- h. Russian thistle, *Salsola tragus*, (1) Grey or brown.
- i. Russian thistle, *Salsola tragus*, (1) Grey or brown.
- j. White campion, *Lychnis alba*, (1) Grey, yellowish grey or reddish grey, (2) Fine spines or tubercles.
- k. Bladder campion, *Silene vulgaris*, (1) Brown or approaching black, (2) Fine spines or tubercles.
- l. Night-flowering catchfly, *Silene noctiflora*, (1) Similar to that of "j," (2) Fine spines or tubercles.
- m. Cow cockle, *Vaccaria vaccaria*, (1) Black, (2) Faintly warted.
- n. Penny-cress, *Thlaspi arvense*, (1) Reddish brown, (2) concentric shining ridges.
- o. Field peppergrass, *Lepidium campestre*, (1) Reddish brown, (2) Dull or finely granular.
- p. Large-fruited false flax, *Camelina sativa*, (1) Light yellow or orange, (2) Waxy.
- q. Small-fruited false flax, *Camelina microcarpa*, (1) Dark red, (2) Dull; finely granular.
- r. Ball mustard, *Neslia paniculata*, (1) Straw colored or brown, (2) Network of ridges.
- s. Black mustard, *Brassica nigra*, (1) Reddish or dark brown, (2) Network of ridges.
- t. Charlock, *Brassica arvensis*, (1) Black or reddish brown, (2) Dull; grey lustre.

PLATE 2.—NOXIOUS WEED SEEDS FOUND IN FARM SEEDS.

(Loaned by Bureau of Plant Industry, U. S. Dept. of Ag.)

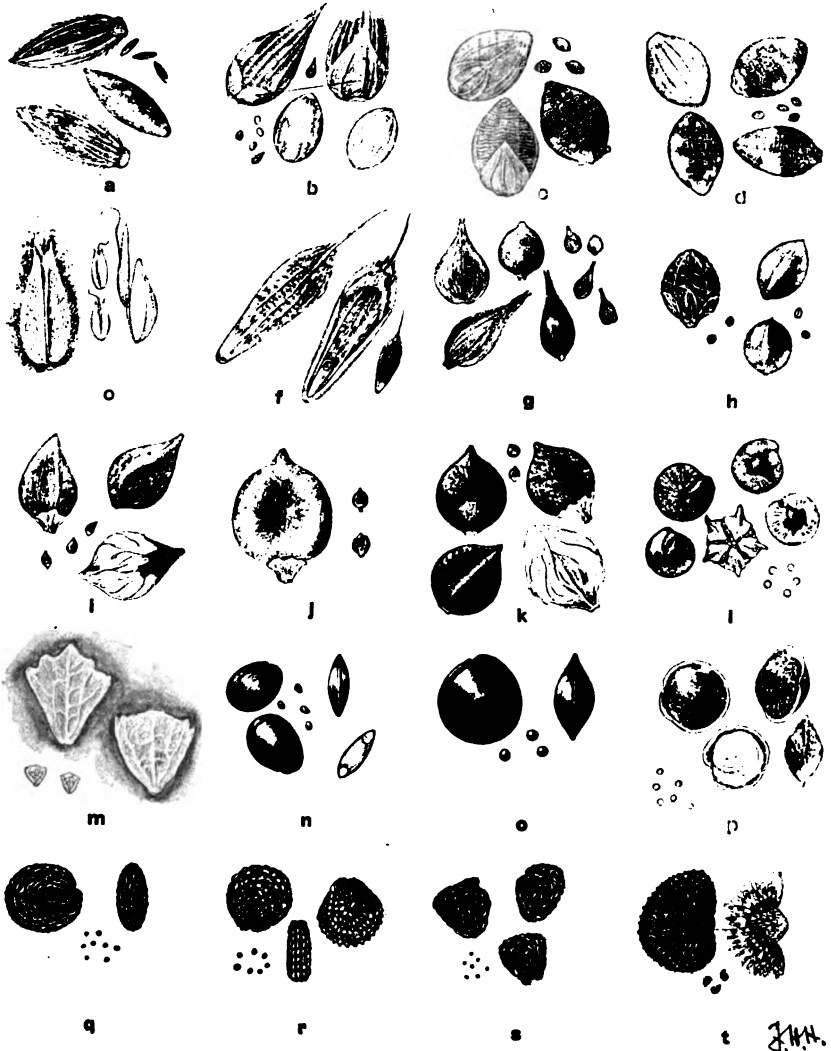


Common and Botanical Names. 1=Color. 2=Appearance Under Low-power Lens.

- a. Indian mustard, *Brassica juncea*, (1) Reddish brown, (2) Network of ridges.
- b. Hare's-ear mustard, *Conrigia orientalis*, (1) Brown or reddish brown, (2) Granular.
- c. Tumbling mustard, *Sisymbrium altissimum*, (1) Orange or dull brown, (2) Waxy.
- d. Wild carrot, *Daucus carota*, (1) Light brown, (2) Ridges with spines.
- e. Field bindweed, *Convolvulus arvensis*, (1) Dull brown, (2) Roughened.
- f. Flax dodder, *Cuscuta epilinum*, (1) Grey or brownish grey, (2) Granular.
- g. Clover dodder, *Cuscuta epithymum*, (1) Grey or brown, (2) Granular.
- h. Small-seeded alfalfa dodder, *Cuscuta planiflora*, (1) Yellowish, greenish or purplish, (2) Roughened or granular.
- i. Field dodder, *Cuscuta arvensis*, (1) Orange or yellowish brown, (2) Dull or granular.
- j. Large-seeded alfalfa dodder, *Cuscuta indecora*, (1) Grey, greenish or brown, (2) Roughened or granular.
- k. Corn groomwell, *Lithospermum arvense*, (1) Grey or brown, (2) Roughened or warty.
- l. Rugel's plaintain, *Plantago Rugelii*, (1) Black, (2) Dull with minute glistening points.
- m. Buckhorn plaintain, *Plantago lanceolata*, (1) Brown or amber, (2) Shiny on concave side; dull in groove.
- n. Ragweed, *Ambrosia artemisiifolia*, (1) Light grey or brown, (2) Irregularly ridged.
- o. Gum-plant, *Grindelia squarrosa*, (1) Whitish or straw, (2) Vertically wrinkled.
- p. Sunflower, *Helianthus annuus*, (1) Grey or brown with black or dark mottlings, (2) Fine verticle wrinkles.
- q. Oxeye daisy, *Chrysanthemum leucanthemum*, (1) Brown or black with ten white vertical ribs.
- r. Canada thistle, *Carduus arvensis*, (1) Light or dark bronze, (2) Smooth.
- s. Bull thistle, *Carduus lanceolatus*, (1) Light grey or brown with darker vertical stripings, (2) Dull.
- t. Chicory, *Cichorium intybus*, (1) Brown or straw with dark spots, (1) Vertically wrinkled; finely webbed.

PLATE 3.—COMMON WEED SEEDS FOUND IN FARM SEEDS.

(Loaned by Bureau of Plant Industry, U. S. Dept. of Ag.)

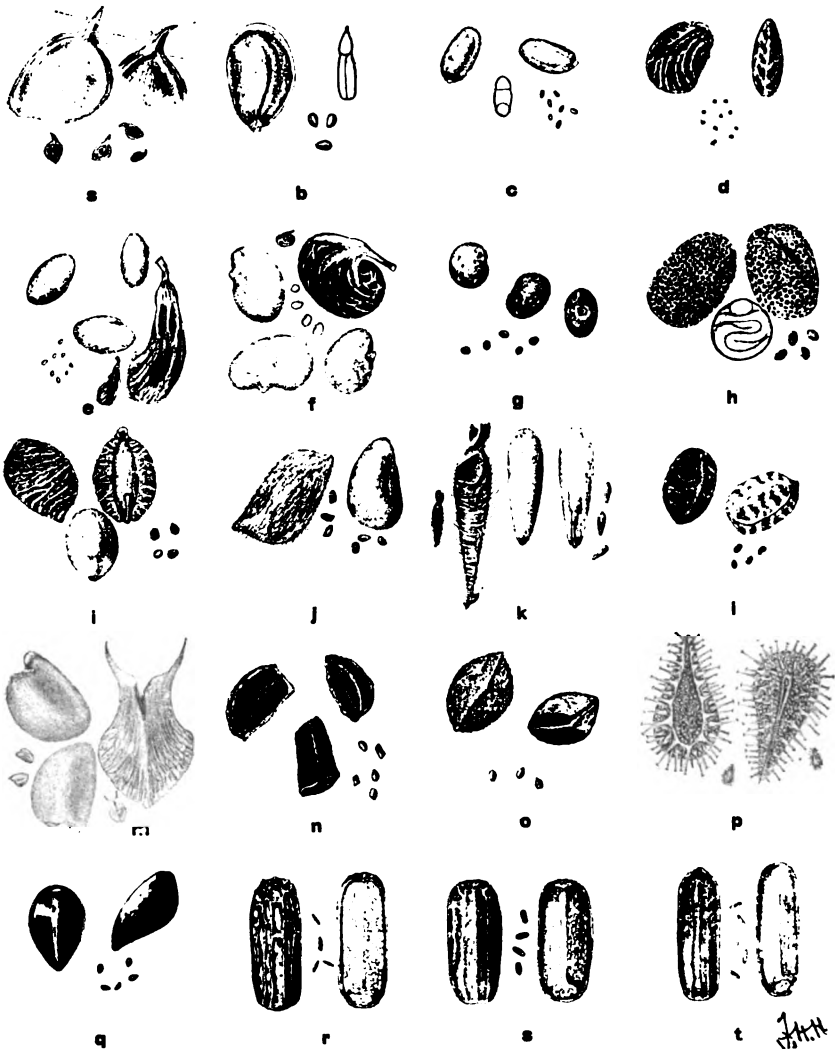


Common and Botanical Names. 1=Color. 2=Appearance Under Low-power Lens.

- a. Crab-grass, *Syntherisma sanguinalis*, (1) Straw green, brown or purplish.
- b. Witch-grass, *Panicum capillare*, (1) Straw or olive green, (2) Shining.
- c. Yellow foxtail, *Chaetochloa glauca*, (1) Free from chaff, light or dark green, (2) Ridged crosswise.
- d. Green foxtail, *Chaetochloa viridis*, (1) Free from chaff; straw or brown, sometimes mottled, (2) Ridged crosswise.
- e. Velvet grass, *Holcus lanatus*, (1) chaff, straw, (2) Having fine, stiffish hairs.
- f. Soft chess, *Bromus hordeaceus*, (1) Straw, (2) Usually wrinkled.
- g. Sedge, *Carex* sp., (1) Free from chaffy hull, light brown, (2) Smooth.
- h. Sorrel, *Rumex acetosella*, (1) Free from hull, reddish brown, (2) Smooth and shining.
- i. Knotweed, *Polygonum aviculare*, (1) Free from covering, reddish brown, (2) Dull.
- j. Pale smartweed, *Polygonum lapathifolium*, (1) Chestnut brown, (2) Shining.
- k. Lady's-thumb, *Polygonum persicaria*, (1) Black or reddish black, (2) Shining.
- l. Lamb's-quarters, *Chenopodium album*, (1) Dark brown or black, (2) Shining.
- m. Wild saltbush, *Atriplex truncata*, (1) Straw, (2) Veined into an imperfect network.
- n. Rough pigweed, *Amaranthus retroflexus*, (1) Black, (2) Highly polished.
- o. Spreading amaranth, *Amaranthus blitoides*, (1) Black, (2) Highly polished.
- p. Spergula arvensis, Spurry, (1) Dull black, encircled by light colored rim, (2) Finely warted.
- q. Chickweed, *Alsine graminea*, (1) Reddish brown or brown, (2) Crinkled appearance, caused by fine ridges.
- r. Chickweed, *Alsine media*, (1) Reddish brown or brown, (2) Stitched appearance, caused by tubercles.
- s. Mouse-ear chickweed, *Cerastium vulgatum*, (1) Reddish brown, (2) Tubercled.
- t. Forked catchfly, *Silene dichotoma*, (1) Reddish brown, (2) fine spines or tubercles.

PLATE 4.—COMMON WEED SEEDS FOUND IN FARM SEEDS.

(Loaned by Bureau of Plant Industry, U. S. Dept. of Ag.)

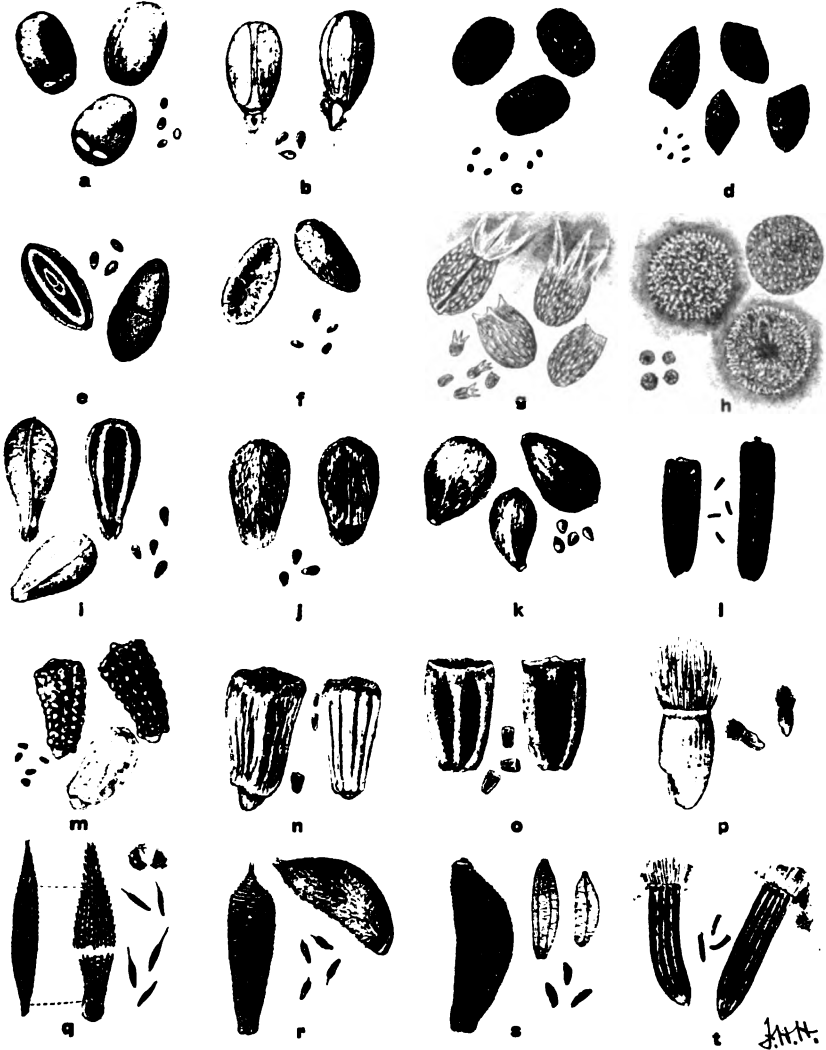


Common and Botanical Names. 1=Color. 2=Appearance Under Low-power Lens.

- a. Creeping buttercup, *Ranunculus repens*, (1) Brown or reddish-brown, (2) Dull.
- b. Poppygrass, *Lepidium virginicum*, (1) Reddish yellow with papery rim, (2) Waxy or dull.
- c. Shepherd's-purse, *Bursa-pastoris*, (1) Reddish yellow, (2) Waxy or dull.
- d. Cinquefoil, *Potentilla monspeliensis*, (1) Straw or brown, (2) With curved, forked ridges.
- e. Hop clover, *Trifolium procumbens*, (1) Yellowish, (2) Shining.
- f. Yellow trefoil, *Medicago lupulina*, (1) Yellowish brown or tinged with green, (2) Smooth.
- g. Bird's-foot trefoil, *Lotus corniculatus*, (1) Brown and mottled, (2) Smooth.
- h. Wild Geranium (cut leaved crane's bill), *Geranium dissectum*, (1) and (2) Brown with light network.
- i. Wild Geranium (Dove's foot crane's bill), *Geranium molle*, (1) and (2) Often with a brown, ridged hull.
- j. Wild Geranium (Small-flowered crane's bill), *Geranium pusillum*, (1) Reddish brown, (2) Smooth.
- k. Milfaria, *Erodium cicutarium*, (1) Seeds proper, brown, (2) Smooth.
- l. Spurge, *Euphorbia nutans*, (1) Steel-gray or brown, (2) Ridged into four angles; faces wrinkled.
- m. Spiny Sida, *Sida spinosa*, (1) Brown, (2) Dull.
- n. Evening primrose, *Oenothera biennis*, (1) Reddish brown, (2) Presenting wrinkled or shriveled appearance.
- o. Red poppyseed, *Anagallis arvensis*, (1) Reddish brown, (2) Finely roughened.
- p. Sticktight, *Lappula lappula*, (1) Grey or brown, (2) With whitish warts and brown, barbed, prickles.
- q. Forget-me not, *Myosotis arvensis*, (1) Black, (2) Shining.
- r. Vervain, *Verbena officinalis*, (1) Reddish or dark brown, (2) Veined on one side, angled on other.
- s. White Vervain, *Verbena urticaefolia*, (1) Reddish or dark brown, (2) Veined on one side, angled on other.

PLATE 5.—COMMON WEED SEEDS FOUND IN FARM SEEDS.

(Loaned by Bureau of Plant Industry, U. S. Dept. of Ag.)



Common and Botanical Names. 1=Color. 2=Appearance Under Low-power Lens.

- a. Catmint, *Nepeta cataria*, (1) Reddish or dark brown, (2) Smooth and dull.
- b. Hecall, *Prunella vulgaris*, (1) Light to dark brown, (2) Slightly roughened, having a diffused lustre.
- c. Rough-leaved toad flax, *Elatinoides spuria*, (1) Light brown, (2) Wrinkled.
- d. Plantain, *Plantago major*, (1) Greenish, brown or black, (2) Roughened by slender wavy lines.
- e. Bracted plantain, *Plantago aristata*, (1) Light or dark brown, (2) Dull.
- f. Dwarf plantain, *Plantago virginica*, (1) Light brown.
- g. Blue field madder, *Sherardia arvensis*, (1) Dull brown, (2) With small white hairs.
- h. Cleavers, *Gallium aparine*, (1) Grey or brown, (2) With hair bearing tubercles.
- i. Wild corn salad, *Valerianella morisonii*, (1) Brown, (2) Quite smooth.
- j. Wild corn salad, *Valerianella* sp., (1) Brown, (2) Somewhat hairy.
- k. Poverty weed, *Iva axillaris*, (1) Rusty brown, (2) Somewhat roughened.
- l. Brown-eyed Susan, *Rudbeckia hirta*, (1) Black, (2) Having fine vertical ridges.
- m. Mayweed, *Anthemis cotula*, (1) Straw or brown, (2) Having warted ridges.
- n. Field camomile, *Anthemis arvensis*, (1) Whitish, light or dark brown, (2) Vertically grooved.
- o. Scentless camomile, *Matricaria inodora*, (1) Black, (2) Rough and ribbed.
- p. Cornflower, *Centaurea cyanus*, (1) Body of seed, bluish grey, (2) Smooth. Brush of bristles, light reddish yellow.
- q. Cat's ear, *Hypochaeris radicata*, (1) Body of seed, reddish brown and (2) rough.
- r. Oxtongue, *Picris echinoides*, (1) Reddish yellow, (2) Darker transverse lines.
- s. Hawkweed *Picris hieracioides*, (1) Reddish brown, (2) Transverse ridges.
- t. Orange pimper, *Hieracium aurantiacum*, (1) Black, (2) Ridged lengthwise; bearing tuft of white bristles.

SEED CLEANING.

When a lot of seed is found to be contaminated with foreign seeds, or if after samples have been submitted to the Department for purity tests, it is found that the seed under examination is below the standard of purity, it is necessary that cleaning be resorted to in order that not only the standards of purity be met, but that the propagation of weeds be reduced as much as possible by the sowing of clean seeds. No effort should be spared under such conditions to have the impure seed cleaned. Many of the large seed houses have seed cleaning machines to which seed can be shipped for cleaning, the usual charge being 25 cents per bushel. There are a number of seed cleaning machines on the market which can be purchased for a reasonable amount, and it might be advisable for some of the larger seed growers to install their own cleaning machines. One of these seed cleaners, which appears to give splendid satisfaction and which is used by many of the seedsmen, can be purchased for from \$125 to \$350, according to size required. The smaller sizes, which cost \$135, have an hourly capacity of 35 to 60 bushels, can be easily installed and do not require much power. Where it is inadvisable or too expensive to ship seed for cleaning to the nearest establishment having a seed cleaning machine, it is recommended by the Department that several seedsmen or farmers club together and purchase and have set up a seed cleaner at some centrally located point where the seed for the neighborhood could be easily shipped and cleaned. The Department is not in a position to recommend any one form or make of seed cleaner, however, by inquiring of those who have such machines in operation, information can be secured by which arrangements could be made to purchase and install these machines.

SPECIAL SAMPLES TESTED FOR PURITY.

In order that the necessity for cleaning seeds and the character of the seed being sold can be determined, the law makes it possible for any citizen of Pennsylvania to have samples tested for purity by the Department for the fee of 25 cents for each sample. These samples submitted for testing should be carefully secured and fairly represent the lot of seed being sampled as otherwise the results of the tests secured will be inaccurate and will not show the true character of the lot under examination. It is, therefore, necessary that when special samples are sent to the Department, they be carefully secured so that the results of the tests will not be misleading. If the seed is in sacks, bags or in bulk, the samples should be taken from several different places in these containers and thoroughly mixed and from 3 to 4 ounces placed in a mailing or special seed envelope and sent to

the Department. The name of the seed and the name and address of the sender should be plainly written on the package and a letter also mailed advising that the sample or samples are being sent and both addressed to the Bureau of Chemistry, Pennsylvania Department of Agriculture. As soon as possible after receipt of samples and fees, tests will be made and a report returned to the senders showing the percentages of pure seed, foreign seed, inert matter, the condition with respect to freedom from dodder and Canada thistle and a receipt for the fees. When sending seeds to be tested, therefore, the following directions should be carefully noted:

Amount of Sample:—3 to 4 ounces, carefully secured and representative of whole lot.

Envelopes:—Should be used and carefully sealed.

Address:—Bureau of Chemistry, Pennsylvania Department of Agriculture, Box R, Harrisburg, Pa. The name of seed and address of sender should be also included.

Charge for Purity Test:—25 cents is the fee charged and it should be submitted with sample in the form of a certified check, money order or cash. If cash is sent for one or two samples, it may be inserted in the sample of seed with safety, if the envelope is carefully sealed.

The following Table (No. I) shows the results obtained upon the 235 special samples of seeds which were sent to the Department to be tested during 1915. These results are included in this report for the purpose of furnishing additional information in regard to the character of the seed being grown and purchased in the State. As many of these samples were submitted for the purpose of determining whether the lot of seed represented should be re-cleaned and did not represent the final quality of seed being sold, the names of the senders are not included. It will be noted that the average results were above the standards and in the majority of cases the samples examined considerably exceeded the requirements. The various kinds of seeds are grouped together and shown in the table by the Analyst's number in the order they were received and also in the order named in the law.

TABLE I—RESULTS OF TESTS ON SPECIAL SAMPLES.

Analyst No.	Name of Seed.	Pure seed.	Foreign seed.	Inert matter.	Seeds of dodder.	Seeds of Canada thistle.
B 377	Red clover,	95.91	2.04	2.06	None.	None.
B 378	Red clover,	96.78	0.18	1.04	None.	None.
B 379	Red clover,	97.80	0.79	1.41	None.	None.
B 380	Red clover,	96.70	1.05	2.26	None.	None.
B 381	Red clover,	97.75	0.76	1.50	None.	None.
B 382	Red clover,	94.46	1.94	3.60	None.	None.
B 383	Red clover,	98.60	1.27	0.13	None.	None.
B 384	Red clover,	99.06	0.56	0.28	None.	None.
B 386	Red clover,	99.18	0.65	0.17	None.	None.
B 387	Red clover,	97.05	2.74	0.21	None.	None.
B 388	Red clover,	96.38	1.51	1.56	None.	None.
B 389	Red clover,	98.28	0.67	0.46	None.	None.
B 390	Red clover,	97.26	1.08	1.62	None.	None.
B 391	Red clover,	96.44	1.84	1.72	None.	None.
B 392	Red clover,	97.19	1.58	0.88	None.	None.
B 393	Red clover,	96.30	3.22	0.53	None.	None.
B 395	Red clover,	95.94	3.38	0.68	None.	None.
B 397	Red clover,	98.75	1.12	0.13	1-2500	None.
B 398	Red clover,	96.66	0.99	2.25	None.	None.
B 399	Red clover,	99.37	0.30	0.23	None.	None.
B 400	Red clover,	98.64	8.48	2.28	None.	None.
B 401	Red clover,	99.89	0.09	0.02	None.	None.
B 402	Red clover,	98.76	0.65	0.60	None.	None.
B 403	Red clover,	98.82	1.15	0.03	None.	None.
B 404	Red clover,	97.58	2.12	0.29	None.	None.
B 405	Red clover,	97.40	2.15	0.46	None.	None.
B 406	Red clover,	98.91	0.64	0.55	None.	None.
B 407	Red clover,	97.79	2.07	0.14	None.	None.
B 408	Red clover,	98.56	0.94	0.80	None.	None.
B 409	Red clover,	99.38	0.39	0.23	None.	None.
B 410	Red clover,	99.84	4.27	6.29	None.	None.
B 411	Red clover,	96.27	2.06	2.70	None.	None.
B 412	Red clover,	97.89	1.74	0.37	None.	None.
B 413	Red clover,	99.67	1.10	0.36	None.	None.
B 414	Red clover,	99.02	0.28	0.70	None.	None.
B 415	Red clover,	98.87	0.05	1.06	None.	None.
B 416	Red clover,	98.68	4.26	2.06	None.	None.
B 417	Red clover,	99.64	19.10	0.26	None.	None.
B 418	Red clover,	99.36	0.27	0.28	None.	None.
B 419	Red clover,	99.50	0.41	0.60	None.	None.
B 420	Red clover,	98.32	0.96	0.72	None.	None.
B 421	Red clover,	99.69	0.17	0.14	None.	None.
B 422	Red clover,	99.47	0.50	0.08	None.	None.
B 423	Red clover,	99.74	0.14	0.13	None.	None.
B 424	Red clover,	94.60	5.16	0.24	None.	None.
B 425	Red clover,	99.02	0.30	0.08	None.	None.
B 426	Red clover,	99.13	5.51	4.86	None.	None.
B 427	Red clover,	98.46	1.14	0.41	None.	None.
B 428	Red clover,	98.08	0.26	0.06	None.	None.
B 429	Red clover,	99.02	8.62	1.26	None.	None.
B 430	Red clover,	99.03	0.54	0.45	None.	None.
B 431	Red clover,	98.64	0.79	0.57	None.	None.
B 432	Red clover,	98.22	7.60	1.18	None.	None.
B 433	Red clover,	97.21	2.61	0.18	None.	None.
B 434	Red clover,	99.77	0.04	0.19	None.	None.
B 435	Red clover,	98.76	0.88	0.26	None.	None.
B 436	Red clover,	99.43	0.16	0.41	None.	None.
B 437	Red clover,	97.78	0.44	1.78	1-50,000	None.
B 438	Red clover,	99.09	0.29	0.62	None.	None.
B 439	Red clover,	98.69	0.82	0.49	None.	None.
B 440	Red clover,	98.30	1.19	0.51	None.	None.
B 441	Red clover,	98.42	1.46	0.12	None.	None.
B 442	Red clover,	96.85	2.69	0.46	None.	None.
B 443	Red clover,	99.90	8.22	1.26	None.	None.
B 444	Red clover,	98.86	1.01	0.13	None.	None.
B 445	Red clover,	99.38	0.51	0.11	None.	None.
B 446	Red clover,	98.71	2.34	0.96	None.	None.
B 447	Red clover,	98.71	0.70	0.59	None.	None.
B 448	Red clover,	98.39	1.10	0.51	None.	None.
B 449	Red clover,	98.85	0.54	0.51	None.	None.
B 450	Red clover,	98.36	0.68	0.11	None.	None.
B 451	Red clover,	99.83	0.02	0.10	None.	None.
B 452	Red clover,	99.64	0.32	0.04	None.	None.
B 453	Red clover,	97.17	2.24	0.60	None.	None.
B 454	Red clover,	98.63	0.62	0.76	None.	None.
B 455	Red clover,	99.33	0.02	0.05	None.	None.
B 456	Red clover,	93.08	3.33	3.09	None.	None.
B 457	Red clover,	97.66	0.53	1.81	None.	None.
B 458	Red clover,	98.34	3.04	0.63	None.	None.

TABLE I—RESULTS OF TESTS ON SPECIAL SAMPLES—Continued.

Analyst No.	Name of Seed.	Pure seed.	Foreign seed.	Inert matter.	Seeds of dodder.	Seeds of Canada thistle.
B 476	Red clover.	98.27	1.21	0.53	None.	None.
B 477	Red clover.	99.48	0.19	0.35	None.	None.
B 478	Red clover.	98.33	2.78	0.89	None.	None.
B 479	Red clover.	93.36	5.63	1.02	None.	None.
B 480	Red clover.	94.47	4.84	0.69	None.	None.
B 482	Red clover.	97.91	1.98	0.16	None.	None.
B 485	Red clover.	95.73	3.29	0.93	None.	None.
B 486	Red clover.	96.04	3.70	0.28	None.	None.
B 487	Red clover.	99.33	0.38	0.39	None.	None.
B 488	Red clover.	98.91	3.04	1.05	None.	None.
B 489	Red clover.	98.49	0.90	0.61	None.	None.
B 490	Red clover.	97.25	2.25	0.49	None.	None.
B 491	Red clover.	99.91	0.00	0.09	None.	None.
B 492	Red clover.	98.06	1.39	0.55	None.	None.
B 493	Red clover.	98.00	1.53	0.47	None.	None.
B 494	Red clover.	94.27	4.25	1.43	None.	None.
B 495	Red clover.	99.79	0.31	0.41	None.	None.
B 496	Red clover.	96.02	3.53	0.46	None.	None.
B 497	Red clover.	99.75	0.15	0.09	None.	None.
B 499	Red clover.	99.10	0.52	0.38	None.	None.
B 502	Red clover.	99.31	0.55	0.14	None.	None.
B 503	Red clover.	95.33	3.70	0.42	None.	None.
B 504	Red clover.	99.61	0.33	0.11	None.	None.
B 505	Red clover.	97.10	2.07	0.33	None.	None.
B 506	Red clover.	99.50	0.43	0.07	None.	None.
B 507	Red clover.	94.82	3.24	1.34	None.	None.
B 508	Red clover.	99.24	0.71	0.05	None.	None.
B 512	Red clover.	98.15	0.85	0.99	1-273	None.
B 513	Red clover.	95.04	4.40	0.56	None.	None.
B 514	Red clover.	96.89	1.30	1.81	None.	None.
B 516	Red clover.	94.65	2.53	2.52	None.	None.
B 517	Red clover.	97.72	1.25	1.03	None.	None.
B 518	Red clover.	98.39	0.99	0.19	None.	None.
B 519	Red clover.	98.78	0.55	0.57	None.	None.
B 520	Red clover.	99.01	1.30	0.39	None.	None.
B 521	Red clover.	99.61	0.12	0.27	None.	None.
B 523	Red clover.	96.40	3.33	0.73	None.	None.
B 528	Red clover.	99.06	0.95	0.29	None.	None.
B 534	Red clover.	87.35	5.10	7.55	None.	None.
B 525	Red clover.	95.15	4.58	0.29	None.	None.
B 527	Red clover.	99.13	0.79	0.08	None.	None.
B 528	Red clover.	94.76	3.89	1.26	None.	None.
B 529	Red clover.	95.72	3.53	0.76	None.	None.
B 530	Red clover.	95.59	4.13	0.28	None.	None.
B 531	Red clover.	90.30	3.87	0.33	None.	None.
B 532	Red clover.	96.64	2.58	0.73	None.	None.
B 533	Red clover.	96.87	2.38	0.20	None.	None.
B 534	Red clover.	99.69	0.12	0.19	None.	None.
B 535	Red clover.	99.42	0.12	0.48	None.	None.
B 536	Red clover.	97.54	1.80	0.86	None.	None.
B 537	Red clover.	96.63	2.93	0.50	None.	None.
B 538	Red clover.	94.08	3.52	2.40	None.	None.
B 539	Red clover.	96.75	0.52	0.83	None.	None.
B 540	Red clover.	97.15	2.24	0.51	None.	None.
B 541	Red clover.	99.37	0.25	0.33	None.	None.
B 542	Red clover.	99.19	0.61	0.20	None.	None.
B 543	Red clover.	93.94	2.84	3.22	None.	None.
B 544	Red clover.	96.98	0.18	0.84	None.	None.
B 545	Red clover.	99.06	0.34	0.60	None.	None.
B 546	Red clover.	92.50	6.12	1.28	None.	None.
B 547	Red clover.	93.36	5.61	1.03	None.	None.
B 548	Red clover.	88.39	10.14	1.47	None.	None.
B 549	Red clover.	97.43	2.17	0.40	None.	None.
B 550	Red clover.	97.71	1.81	0.48	None.	None.
B 551	Red clover.	96.89	2.76	0.35	None.	None.
B 552	Red clover.	97.56	1.43	1.01	None.	None.
B 553	Red clover.	98.25	1.42	0.33	None.	None.
B 554	Red clover.	98.64	1.80	4.58	None.	None.
B 555	Red clover.	97.96	1.74	0.30	None.	None.
B 556	Red clover.	95.76	3.89	4.25	None.	None.
B 557	Red clover.	96.23	0.58	1.12	None.	None.
B 558	Red clover.	82.51	14.73	3.78	None.	None.
B 559	Red clover.	98.15	0.61	1.24	None.	None.
B 560	Red clover.	97.82	2.53	0.10	None.	None.
B 561	Red clover.	96.76	1.08	0.17	None.	None.
B 562	Red clover.	99.22	0.71	0.07	None.	None.
B 563	Red clover.	99.05	0.33	0.07	None.	None.
B 564	Red clover.	99.16	10.41	0.42	None.	None.
B 566	Red clover.	99.25	0.23	0.53	None.	None.

TABLE I—RESULTS OF TESTS ON SPECIAL SAMPLES—Continued.

Analyst No.	Name of Seed.	Pure seed.	Foreign seed.	Inert matter.	Seeds of dodder.	Seeds of Canada thistle.
B 567	Red clover,	94.78	4.25	1.02	None.	None.
B 568	Red clover,	96.72	0.72	0.56	None.	None.
B 569	Red clover,	98.23	1.29	0.29	None.	None.
B 570	Red clover,	97.06	1.51	1.53	None.	None.
B 571	Red clover,	98.22	0.99	0.79	None.	None.
B 573	Red clover,	97.41	2.33	0.26	None.	None.
B 590	Red clover,	99.94	0.06	0.00	None.	None.
B 601	Red clover,	99.69	0.23	0.06	None.	None.
B 602	Red clover,	98.92	0.76	0.32	None.	None.
B 605	Red clover,	99.61	0.23	0.16	None.	None.
B 606	Red clover,	98.57	1.23	0.20	1-3, 098	None.
B 610	Red clover,	99.78	0.10	0.12	None.	None.
B 611	Red clover,	96.06	1.80	0.15	None.	None.
Average,		97.04	2.11	0.85		
B 480	Alfalfa,	99.59	0.20	0.21	None.	None.
B 526	Alfalfa,	99.90	0.00	0.10	None.	None.
B 565	Alfalfa,	98.66	0.08	0.26	None.	None.
B 572	Alfalfa,	99.51	0.23	0.26	None.	None.
B 575	Alfalfa,	99.59	0.04	0.27	None.	None.
B 576	Alfalfa,	99.67	0.05	0.26	None.	None.
B 577	Alfalfa,	99.90	0.00	0.10	None.	None.
B 578	Alfalfa,	99.75	0.04	0.21	None.	None.
B 609	Alfalfa,	96.08	4.76	2.16	None.	None.
Average,		98.97	0.64	0.44		
B 412	Timothy grass,	98.23	0.58	0.19	None.	None.
B 422	Timothy grass,	99.75	0.15	0.10	None.	None.
B 423	Timothy grass,	99.36	0.27	0.37	None.	None.
B 441	Timothy grass,	98.89	0.32	5.79	None.	None.
B 442	Timothy grass,	99.75	0.10	0.15	None.	None.
B 443	Timothy grass,	99.92	0.06	0.02	None.	None.
B 444	Timothy grass,	99.63	0.08	0.24	None.	None.
B 445	Timothy grass,	97.68	1.98	0.26	None.	None.
B 473	Timothy grass,	99.26	0.19	0.55	None.	None.
B 481	Timothy grass,	99.22	0.90	0.78	None.	None.
B 483	Timothy grass,	99.13	0.57	0.30	None.	None.
B 494	Timothy grass,	96.92	0.57	0.51	None.	None.
B 501	Timothy grass,	96.32	0.78	0.90	None.	None.
B 511	Timothy grass,	96.63	0.83	0.49	None.	None.
B 515	Timothy grass,	96.55	0.67	0.78	None.	None.
B 574	Timothy grass,	85.00	8.23	6.78	None.	None.
B 579	Timothy grass,	99.07	0.41	0.52	None.	None.
B 580	Timothy grass,	96.38	0.92	0.70	None.	None.
B 582	Timothy grass,	96.91	1.19	1.90	None.	None.
B 583	Timothy grass,	97.71	1.79	0.50	None.	None.
B 584	Timothy grass,	99.60	0.26	0.14	None.	None.
B 585	Timothy grass,	97.68	2.19	0.18	None.	None.
B 586	Timothy grass,	96.91	0.66	0.42	None.	None.
B 587	Timothy grass,	98.26	0.90	0.84	None.	None.
B 588	Timothy grass,	99.71	0.23	0.06	None.	None.
B 589	Timothy grass,	99.30	0.60	0.10	None.	None.
B 590	Timothy grass,	95.87	2.84	1.29	None.	None.
B 592	Timothy grass,	99.12	0.57	0.31	None.	None.
B 593	Timothy grass,	99.50	0.28	0.22	None.	None.
B 594	Timothy grass,	99.86	0.06	0.06	None.	None.
B 595	Timothy grass,	96.52	0.87	0.61	None.	None.
B 596	Timothy grass,	99.72	0.14	0.14	None.	None.
B 597	Timothy grass,	99.99	0.00	0.01	None.	None.
B 598	Timothy grass,	96.20	1.05	0.76	None.	None.
B 599	Timothy grass,	96.95	0.67	0.38	None.	None.
B 603	Timothy grass,	99.93	0.03	0.04	None.	None.
B 604	Timothy grass,	99.79	0.08	0.18	None.	None.
B 607	Timothy grass,	97.16	2.33	0.51	None.	None.
B 609	Timothy grass,	99.68	0.01	0.31	None.	None.
Average,		98.44	0.89	0.68		
B 385	Alsike clover,	92.36	6.16	1.48	None.	None.
B 396	Alsike clover,	96.25	0.93	0.53	None.	None.
B 413	Alsike clover,	96.93	2.82	0.26	None.	None.
B 424	Alsike clover,	97.65	1.74	0.61	None.	None.
B 448	Alsike clover,	99.33	0.26	0.32	None.	None.
B 449	Alsike clover,	95.78	3.85	0.87	None.	None.
B 455	Alsike clover,	96.24	0.63	1.14	None.	None.
B 486	Alsike clover,	97.27	1.66	1.08	None.	None.
B 500	Alsike clover,	97.86	1.41	0.74	None.	None.
Average,		97.07	2.17	0.76		

TABLE I—RESULTS OF TESTS ON SPECIAL SAMPLES—Concluded.

Analyst No.	Name of Seed.	Pure seed.	Foreign seed.	Inert matter.	Seeds of godder.	Seeds of Canada thistle.
B 434	Perennial rye grass,	97.96	1.65	0.39	None.	None.
B 510	White clover,	92.40	6.24	1.36	None.	None.
B 435	Red top grass,	92.62	1.37	6.01	None.	None.
B 500	Canadian blue grass,	93.15	5.35	1.50	None.	None.
B 433	Kentucky blue grass,	89.64	0.44	9.93	None.	None.
B 581	Kentucky blue grass,	75.17	1.02	23.81	None.	None.
B 591	Kentucky blue grass,	76.48	0.84	23.73	None.	None.
	Average,	80.41	0.77	13.82		

RESULTS OF INSPECTION.

Each of the 221 official samples of seeds representing 19 kinds secured by Special Agents of the Department were carefully tested for purity and an average of the results of each kind of seed, which will be noted by referring to Table No. III, exceeded the established standards of purity.

Of the 74 samples of red clover tested, 4 fell below the standard of purity. Eleven were found to be guaranteed and 6 of these were less than the guarantees but above 97% pure. One sample which was below the standard contained both the seeds of dodder and Canada thistle to the extent of one seed in 2,500 and 1 in 16,000 respectively. In 2 other samples dodder was detected in amounts not exceeding 1 seed in 3,000. The highest test was 99.87 per cent., the lowest 92.51 per cent. and the average 98.67 per cent.

Only 2 samples of crimson clover were received and examined both of which passed the standard, the average being 98.18 per cent. pure seed.

Of the 22 samples of alfalfa tested, only 1 was found to be below the standard testing 91.64 per cent. In 2 samples dodder was present to the extent of 1 seed in 18,000, and one in 35,500 respectively. The highest purity test was 99.94 per cent., the average being 99.11 per cent.

The number of samples of timothy-grass seed examined was 42, one of these fell below the standard and tested 96.38 per cent. and 1 tested 100 per cent. pure, the average being 99.14 per cent. Two samples were guaranteed; one 99 per cent. which was found to exceed this amount in per cent. of pure seed, testing 99.13 per cent. and another 99.50 per cent. which was found to contain 99.06 per cent. pure seed.

Of the cereal seeds received there were two samples of barley averaging 98.70 per cent.; 1 of spelt testing 99.49 per cent.; 1 of wheat, testing 99.55 per cent.; 7 of oats, averaging 98.58 per cent. and 1 sample of rye which showed 98.98 per cent. pure seed. All of these seeds met the standard of 97 per cent. and, except in 3 cases, were close to 99 per cent. pure.

Of the 37 samples of alsike clover tested for purity, 3 failed to meet the standard of 95 per cent., two samples represented stock guaranteed 99 per cent. pure, but which tested 98.01 per cent. and 98.49 per cent. passing the standard. One sample was guaranteed 97 per cent. and tested 94.89 per cent. The highest test was 99.28 per cent., the lowest 90.96 per cent. and the average 97.04 per cent. In 6 samples, which exceeded 95 per cent., Canada thistle was present in amounts ranging from 1 seed in 63,000 to 1 seed in 80,000.

The one sample of perennial rye grass received gave a test of 95.35 per cent. pure.

The millet seed secured for examination included 5 samples of German millet, averaging 99.16 per cent., 3 of Hungarian millet, averaging 98.48 per cent.; all meeting the standard of 95 per cent. and 1 of Common millet testing 99.22 per cent. In 1 sample of Hungarian millet, 1 seed of Canada thistle was detected in 3,000 of pure seed. Common millet is not included in the law and therefore no standard of purity is required, however, as the sample was secured in the usual manner it was thought advisable to make the test and include it in this report.

Five samples of white clover were received during the year, 1 of which was found to be guaranteed. The standard of purity for this seed is 90 per cent and the samples tested exceeded the standard. The highest test was 97.91 per cent., the lowest 90.92 per cent. and the average 94.07 per cent.

Five samples of redtop grass were received and the results of the purity test showed that all exceeded the standard of 85 per cent. The highest test was 96.37 per cent., the lowest 88.42 per cent. and the average 92.42 per cent.

Only 1 sample of Canadian blue grass was received which tested 88.06 per cent. pure seed.

The orchard grass seed was represented by 5 samples ranging from 79.07 per cent. to 90.16 per cent. with an average of 82.02 per cent. which exceeded the standard of 75 per cent.

There were 6 samples of Kentucky blue grass received giving an average purity test of 76.14 per cent. which slightly exceeded the standard of 75 per cent. Two of the samples fell below the guarantee and one of these, the lower which tested 60.67 per cent., contained Canada thistle to the extent of 1 seed in 128,000, the highest test being 85.46 per cent.

The seeds of dodder and Canada thistle were found to be present in 15 samples of seeds out of the 221 examined. The seeds of dodder were present in the red clover and alfalfa seeds; and the seeds of Canada thistle were the most numerous in alsike clover, being present in 6 samples, and were found in 1 sample of each of the following: Hungarian millet, Canadian blue grass and Kentucky blue grass.

In the following Table (No. II) will be found the results of the tests for purity made on the official samples of seeds collected during the year together with the names and addresses of the dealers from whom they were secured and of the seedsmen or seed growers from whom the seed was originally purchased. They are arranged in the order in which they are named in the seed law and also show their condition with respect to being free from the seeds of dodder and Canada thistle.

Table No. III shows the average results secured on each kind of seed tested together with the standards of purity.

Table No. IV, which also follows, shows the number of times foreign or noxious seeds occurred in each of the official samples examined together with their scientific and common names. A study of this table and becoming familiar with the general appearance of the seeds which occurred frequently and which are illustrated in the Plates included in the foregoing pages, will enable one to identify these seeds when they are present in the various kinds of seeds offered for sale.

TABLE II—RESULTS OF TESTS ON SAMPLES COLLECTED IN 1915.

Analyst's number.	Name of Seed and Name and Address of Grower or Seedman.	Name and Address of Dealer.	Pure Seed.		Foreign seed.	Inert matter.	Seeds of dodder.	Seeds of Canada thistle.
			Found.	Guaranteed.				
			Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.
RED CLOVER.								
A 419	Mammoth, J. Boileau & Son, Baltimore, Md.	Lancon Brothers, Tionesta.	98.55	98.62	0.17	0.28	.....	.....
A 419	Medium, John J. Buffington, Baltimore, Md.	Stichter Hardware Co., Reading.	98.55	98.62	0.39	0.58	.....	.....
A 420	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	Stichter Hardware Co., Reading.	98.91	99.0	0.73	0.37	.....	.....
A 421	Mammoth, Churchhill Grain and Seed Co., Toledo, Ohio.	Stichter Hardware Co., Reading.	98.43	99.0	1.16	0.41	.....	.....
A 422	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	H. L. Orr, Tyrone.	98.32	.....	0.77	0.31	.....	.....
A 423	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	Leonard Ritter, St. Marys.	98.51	.....	3.24	4.35	.....	.....
A 424	Eagle Brand, Crater Brothers, Toledo, Ohio.	H. L. Orr, Tyrone.	98.06	.....	0.40	0.52	.....	.....
A 425	Pine Tree Mammoth, Craver-Dickinson Seed Co., Buffalo, N. Y.	Waite & McClain, Tyrone.	98.51	.....	1.41	0.53	.....	.....
A 426	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	Blank & Gottshall, Sunbury.	98.90	.....	0.91	0.19	.....	.....
A 427	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	Chapel's Seed Store, Williamsport.	98.81	.....	0.23	0.43	.....	.....
A 428	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	Hudson & Kuhns, Greensburg.	98.55	.....	0.24	0.11	.....	.....
A 429	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	McFarland Supply Co., Greensburg.	98.53	.....	0.70	0.47	.....	.....
A 430	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	John Thomas & Sons, Johnstown.	98.05	.....	0.63	0.27	.....	.....
A 431	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	John Thomas & Sons, Johnstown.	98.96	.....	0.95	0.13	.....	.....
A 432	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	The Loucks Hardware Co., Scottsdale.	98.73	.....	0.84	0.43	.....	.....
A 433	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	The Loucks Hardware Co., Scottsdale.	98.30	.....	1.45	0.31	.....	.....
A 434	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	L. A. Fischer & Co., Bradford.	98.82	.....	0.45	0.23	.....	.....
A 435	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	L. A. Fischer & Co., Bradford.	98.83	.....	0.56	0.25	.....	.....
A 436	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	R. W. & M. F. Rose Co., Mansfield.	98.54	.....	1.09	0.37	.....	.....
A 437	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	R. J. Dunham, Wellaboro.	98.13	.....	1.43	0.39	.....	.....
A 438	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	R. J. Dunham, Wellaboro.	98.30	.....	1.05	0.17	.....	.....
A 439	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	Hart & Brother, Inc., Reading.	98.08	99.0	1.79	0.12	.....	.....
A 440	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	Bard Hardware Co., Reading.	97.43	.....	2.03	0.54	.....	.....
A 441	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	J. F. Murphy, Clearfield.	99.29	.....	0.43	0.23	.....	.....
A 442	Medium, Churchhill Grain and Seed Co., Toledo, Ohio.	Emporium Milling Co., Emporium.	98.51	99.0	0.19	0.30	.....	.....

TABLE II—RESULTS OF TESTS ON SAMPLES COLLECTED IN 1915—Continued.

Analyst's number.	Name of Seed and Name and Address of Grower or Seedman.	Name and Address of Dealer.		Pure Seed.		Foreign seed.	Inert matter.	Seeds of dodder.	Seeds of Canada thistle.
				Found.	Guaranteed.				
				Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.
A 411	Standard A. Brand Mammoth, O. Gandy & Co., South	Enterprise Milling Co., Oil City,	Oil City,	98.37	98.0	0.06	0.04	.....	.....
A 412	Whitley Ind. O. Gandy & Co., South Whitley, Ind.,	Enterprise Milling Co., Oil City,	Oil City,	99.32	99.0	0.14	0.04	.....	.....
A 413	Fancy A. Brand, Henry Hirsh, Toledo, Ohio,	Quarryville Farmers' Assoc., Quarryville,	Quarryville,	97.46	.....	1.89	0.55	.....	.....
A 414	....., Henry Hirsh, Toledo, Ohio,	Herr & Co., Lancaster,	Lancaster,	98.23	.....	1.21	0.56	.....	.....
A 415	....., D. S. Kloss, Tyone, Pa.,	Waite & McClain, Tyone,	Tyone,	99.35	.....	2.87	0.24	.....	.....
A 416	Medium, K. M. McFarland, Greensburg, Pa.,	McFarland Supply Co., Greensburg,	Greensburg,	96.97	.....	0.97	0.16	.....	.....
A 417	Mammoth, Nungesser-Dickinson Seed Co., New York, N. Y.,	H. F. Hertzog, Reading,	Reading,	99.06	.....	0.83	0.09	.....	.....
A 418	Mammoth, The Philadelphia Seed Co., Philadelphia, Pa.,	The John H. Obold, Co., Reading,	Reading,	93.74	9.70	1.04	0.22	1-6000	.....
A 419	Mammoth, The Philadelphia Seed Co., Philadelphia, Pa.,	A. W. Masser, Reading,	Reading,	99.50	.....	0.38	0.02	.....	.....
A 420	Quaker Brand, The Philadelphia Seed Co., Philadelphia, Pa.,	Harry K. Hershey, Leaman Place,	Leaman Place,	99.20	.....	0.81	0.49	.....	.....
A 421	Home Grown, Jacob Reish, Unknown,	H. I. Orr, Tyone,	Tyone,	98.14	.....	0.72	1.14	.....	.....
A 422	Small, Walter S. Schell, Harrisburg, Pa.,	Walter S. Schell, Harrisburg,	Harrisburg,	99.54	.....	0.30	0.16	.....	.....
A 423	Small, Scobie & Parker Co., Pittsburgh, Pa.,	Scobie & Parker Co., Pittsburgh,	Pittsburgh,	98.18	.....	1.32	0.50	.....	.....
A 424	Mammoth, Scobie & Parker Co., Pittsburgh, Pa.,	Scobie & Parker Co., Pittsburgh,	Pittsburgh,	98.97	.....	0.49	0.54	.....	.....
A 425	Special Medium, The I. W. Scott Co., Pittsburgh, Pa.,	The I. W. Scott Co., Pittsburgh,	Pittsburgh,	99.69	.....	0.15	0.26	.....	.....
A 426	AAA Medium, The I. W. Scott Co., Pittsburgh, Pa.,	The I. W. Scott Co., Pittsburgh,	Pittsburgh,	98.65	.....	0.28	0.10	.....	.....
A 427	AAA Medium, The I. W. Scott Co., Pittsburgh, Pa.,	The I. W. Scott Co., Pittsburgh,	Pittsburgh,	98.65	.....	0.27	0.10	.....	.....
A 428	Special Mammoth, The I. W. Scott Co., Pittsburgh, Pa.,	The I. W. Scott Co., Pittsburgh,	Pittsburgh,	98.70	.....	0.27	0.04	.....	.....
A 429	AAA Mammoth, The I. W. Scott Co., Pittsburgh, Pa.,	The I. W. Scott Co., Pittsburgh,	Pittsburgh,	99.70	.....	0.05	0.35	.....	.....
A 430	Furitan Brand, W. A. Simpson & Co., Baltimore, Md.,	John G. Simpson, Huntingdon,	Huntingdon,	99.19	.....	0.28	0.13	.....	.....
A 431	Purity Brand, W. A. Simpson & Co., Baltimore, Md.,	Waite & McClain, Tyone,	Tyone,	98.03	.....	1.22	0.65	.....	.....
A 432	Purity Brand, W. A. Simpson & Co., Baltimore, Md.,	Waite & McClain, Tyone,	Tyone,	99.26	.....	0.42	0.33	.....	.....
A 433	Purity Brand, W. A. Simpson & Co., Baltimore, Md.,	S. Book & Brother, Quarryville,	Quarryville,	99.57	.....	0.35	0.06	.....	.....
A 434	Purity Brand, W. A. Simpson & Co., Baltimore, Md.,	Lansons Brothers, Tionesta,	Tionesta,	99.30	98.5	0.19	0.42	.....	.....
A 435	Purity Brand, W. A. Simpson & Co., Baltimore, Md.,	Lansons Brothers, Tionesta,	Tionesta,	99.19	98.5	0.46	0.23	.....	.....
A 436	Page, W. H. Small & Co., Evansville, Ind.,	King Brothers, Uniontown,	Uniontown,	98.94	.....	0.42	0.64	.....	.....
A 437	Mammoth, W. H. Small & Co., Evansville, Ind.,	F. O. Ackley, Westfield,	Westfield,	94.37	.....	4.37	1.35	1-2,500	.....
A 438	Mammoth, W. H. Small & Co., Evansville, Ind.,	Equity Co-Operative Exchange, Wellsboro,	Wellsboro,	94.94	.....	4.31	0.75	1-16,000	.....
A 439	Pea Vine Brand, A. Y. Sony, Lebanon, Ind.,	R. W. & M. F. Rose Co., Mansfield,	Mansfield,	99.50	.....	0.07	0.23	.....	.....
A 440	Reliable Brand Medium, The Standard Seed Co., Pottsville, Pa.,	Early & Detweiler, Palmyra,	Palmyra,	98.57	.....	0.78	0.43	.....	.....

N. Y.

A 353	Reliable Brand Mammoth, The Stanford Seed Co., Buffalo, N. Y.	Port Allegany Milling Co., Port Allegany, Pa.	96.57	0.47	0.96
A 354	Star Brand Medium, Tyne, Pa.	Grazer Brothers, Tyne, Pa.	98.52	0.65	0.83
A 355	Star Brand Medium, The Toledo Field Seed Co., Inc., Toledo, Ohio.	Early & Detweiler, Fairbury, Pa.	96.00	1.74	0.26
A 356	The Toledo Field Seed Co., Inc., Toledo, Ohio.	W. W. Welliver, Danville, Pa.	98.27	1.29	0.34
A 357	Western Grain Co., Unknown.	Mike Duvana, New Salem, Pa.	98.20	0.90	0.90
A 358	Eureka, Whitney-Eckstein Seed Co., Buffalo, N. Y.	J. H. Ketterling & Son, Fairbury, Pa.	98.37	0.23	0.30
A 359	Eureka Medium, Whitney-Eckstein Seed Co., Buffalo, N. Y.	Newgard & Bachman, Ansville, Pa.	98.73	0.13	0.14
A 360	Pan-American, Whitney-Eckstein Seed Co., Buffalo, N. Y.	A. J. Steele, Latrobe, Pa.	98.20	1.30	0.50
A 361	Imperator, Whitney-Eckstein Seed Co., Buffalo, N. Y.	A. J. Steele, Latrobe, Pa.	97.78	1.46	0.77
A 362	Pan-American, Whitney-Eckstein Seed Co., Buffalo, N. Y.	C. H. Miller Hardware Co., Huntingdon, Pa.	97.67	1.83	0.40
A 363	Imperator, Whitney-Eckstein Seed Co., Buffalo, N. Y.	J. H. Brown & Son, Mt. Pleasant, Pa.	98.70	0.13	0.13
A 364	Pan-American Mammoth, Whitney-Eckstein Seed Co., Buffalo, N. Y.	Herzog Milling Co., Smethport, Pa.	98.32	0.96	0.52
A 365	Whitney-Eckstein Seed Co., Buffalo, N. Y.	Rochester Seed and Supply Co., Rochester, Pa.	97.96	1.42	0.60
A 366	Elk, Whitney-Noyes Seed Co., Buffalo, N. Y.	J. O. Reed, Philipsburg, Pa.	98.35	0.46	1-3,000
A 367	Unknown, Unknown.	A. M. Weltmer's Sons, Lebanon, Pa.	98.34	0.59	1.07
A 368	Puritan Brand Mammoth, Unknown.	R. W. & M. F. Rose Co., Mansfield, Pa.	98.92	0.99	0.09
A 369	Rose Brand Mammoth, Unknown.	R. W. & M. F. Rose Co., Mansfield, Pa.	98.49	0.35	0.16
A 370	Unknown, Unknown.	Sprecher & Ganss, Lancaster, Pa.	98.41	0.39	0.20
A 371	Scoble & Parker Co., Pittsburgh, Pa.	Average.	98.67	0.89	0.44
A 372	Special, The I. W. Scott Co., Pittsburgh, Pa.	Scoble & Parker Co., Pittsburgh, Pa.	97.30	2.12	0.53
A 373	Special, The I. W. Scott Co., Pittsburgh, Pa.	The I. W. Scott Co., Pittsburgh, Pa.	98.06	0.51	0.53
A 374	ALFALFA	Average.	98.19	1.32	0.50
A 375	J. Roliano & Son, Baltimore, Md.	Lanson Brothers, Tionesta, Pa.	98.59	0.10	0.21
A 376	Chubbitt Grain & Seed Co., Toledo, Ohio.	Leonard Ritter, St. Marys, Pa.	98.89	0.05	0.13
A 377	E. W. Conklin Co., Bangor, N. Y.	W. W. Welliver, Danville, Pa.	98.79	0.08	0.13
A 378	Globe, Craver-Dickinson Seed Co., Inc., Buffalo, N. Y.	King Brothers, Tionesta, Pa.	98.43	0.34	0.23
A 379	Pine Tree, Craver-Dickinson Seed Co., Inc., Buffalo, N. Y.	Wale & McClain, Tyne, Pa.	98.47	0.23	0.31
A 380	Pine Tree Brand, Craver-Dickinson Seed Co., Inc., Buffalo, N. Y.	Port Allegany Milling Co., Port Allegany, Pa.	98.75	0.05	0.16
A 381	Craver-Dickinson Seed Co., Inc., Chicago, Ill.	Chapel's Seed Store, Williamsport, Pa.	98.60	0.12	0.23
A 382	The Albert Dickinson Seed Co., Chicago, Ill.	McFarland Supply Co., Greensburg, Pa.	98.94	0.01	0.05
A 383	Ace Brand, The Albert Dickinson Seed Co., Chicago, Ill.	R. W. & M. F. Rose Co., Mansfield, Pa.	98.74	0.06	0.20
A 384	Ace Brand, The Albert Dickinson Seed Co., Chicago, Ill.	R. J. Dunham, Wellsboro, Pa.	98.91	0.00	0.09
A 385	The Albert Dickinson Seed Co., Chicago, Ill.	Sprecher & Ganss, Lancaster, Pa.	98.39	0.23	0.38
A 386	Henry Hirsch, Toledo, Ohio.	Herr & Co., Lancaster, Pa.	97.30	2.34	1-85,500
A 387	The Philadelphia Seed Co., Philadelphia, Pa.	A. W. Masser, Reading, Pa.	98.67	0.14	0.19
A 388	The Philadelphia Seed Co., Philadelphia, Pa.	H. L. Orr, Tyne, Pa.	98.90	0.04	0.16
A 389	The Philadelphia Seed Co., Philadelphia, Pa.	Harry K. Hershey, Leaman Place, Pa.	98.77	0.06	0.17
A 390	Walter S. Schnell, Harrisburg, Pa.	Walter S. Schnell, Harrisburg, Pa.	98.28	0.50	0.17
A 391	Scoble & Parker Co., Pittsburgh, Pa.	Scoble & Parker Co., Pittsburgh, Pa.	91.64	8.25	0.11
A 392	Special, The I. W. Scott Co., Pittsburgh, Pa.	The I. W. Scott Co., Pittsburgh, Pa.	98.16	1.07	0.13
A 393	Whitney-Eckstein Seed Co., Buffalo, N. Y.	Hard Hardware Co., Reading, Pa.	98.49	0.17	0.25
A 394	Whitney-Eckstein Seed Co., Buffalo, N. Y.	The Philadelphia Hardware and Supply Co., Latrobe, Pa.	98.69	0.17	0.14

TABLE II—RESULTS OF TESTS ON SAMPLES COLLECTED IN 1915—Continued.

Analyst's number.	Name of Seed and Name and Address of Grower or Seedman.	Name and Address of Dealer.		Pure Seed.		Foreign seed.	Inert matter.	Seeds of fodder.	Seeds of Canada thistle.
		Found.	Guaranteed.	Per ct.	Per ct.				
A 352	Fancy, Whitney-Eckstein Seed Co., Buffalo, N. Y.,								
A 353	..... Unknown,								
TIMOTHY GRASS.									
A 356	Fancy, Churchill Grain and Seed Co., Toledo, Ohio,								
A 359	..... Churchill Grain and Seed Co., Toledo, Ohio,								
A 358	..... E. W. Conklin & Co., Binghamton, N. Y.,								
A 359	Choice, E. W. Conklin & Co., Binghamton, N. Y.,								
A 371	Rose Brand, E. W. Conklin & Co., Binghamton, N. Y.,								
A 371	King Brand, E. W. Conklin & Co., Binghamton, N. Y.,								
A 377	Royal, Cratz Brothers, Toledo, Ohio,								
A 387	Pine Tree, Craver-Dickinson Seed Co., Buffalo, N. Y.,								
A 386	..... The Albert Dickinson Seed Co., Chicago, Ill.,								
A 386	Pine Tree, The Albert Dickinson Seed Co., Chicago, Ill.,								
A 370	Pine Tree, The Albert Dickinson Seed Co., Chicago, Ill.,								
A 373	Globe Brand, The Albert Dickinson Seed Co., Chicago, Ill.,								
A 375	Pine Tree Brand, The Albert Dickinson Seed Co., Chicago, Ill.,								
A 401	..... The Albert Dickinson Seed Co., Chicago, Ill.,								
A 410	Pine Tree, The Albert Dickinson Seed Co., Chicago, Ill.,								
A 343	Furnas-Brown Grain Co., Saint Paul, Minn.,								
A 355	R. D. Gingery, Unknown,								
A 359	Standard A. Brand, O. Gandy & Co., South Whitley, Ind.,								
A 358	Value, Henry Hirsch, Toledo, Ohio,								
A 358	..... Noble Brothers, Pittsburgh, Pa.,								
A 358	Philadelphia Seed Co., Philadelphia, Pa.,								
A 358	Philadelphia Seed Co., Philadelphia, Pa.,								
A 358	Walter S. Schell, Harrisburg, Pa.,								
A 358	Scoble & Parker Co., Pittsburgh, Pa.,								
A 358	..... Sprechter & Ganns, Lancaster,								
A 358	J. A. Gault Co., Kittanning,								
A 358	J. T. Murphy, Clearfield,								
A 358	Walte & McClain, Tyrone,								
A 358	Emporium Milling Co., Emporium,								
A 358	Herr & Co., Lancaster,								
A 358	Rochester Seed and Supply Co., Rochester,								
A 358	Hard Hardware Co., Reading,								
A 358	A. W. Masser, Reading,								
A 358	Harry K. Hershey, Leaman Place,								
A 358	Walter S. Schell, Harrisburg,								
A 358	Scoble & Parker Co., Pittsburgh,								

A 279	Special, The I. W. Scott Co., Pittsburgh, Pa.,	The I. W. Scott Co., Pittsburgh,	100.00	.....	.....	0.15	0.19	.....
A 280	XXX, The I. W. Scott Co., Pittsburgh, Pa.,	The I. W. Scott Co., Pittsburgh,	98.64	.....	.....	0.53	0.99	.....
A 281	XX, The I. W. Scott Co., Pittsburgh, Pa.,	The I. W. Scott Co., Pittsburgh,	98.49	.....	.....	0.74	0.20	.....
A 416	Purity Brand, W. A. Simpson & Co., Baltimore, Md.,	Lansom Brothers, Tionesta,	99.5	.....	.....	0.63	0.30	.....
A 315	Faro, W. H. Small & Co., Evansville, Ind.,	King Brothers, Uniontown,	96.13	.....	.....	0.32	0.24	.....
A 285	..... W. H. Small & Co., Evansville, Ind.,	Equity Co-Operative Exchange, Wellsboro,	96.44	.....	.....	0.13	0.25	.....
A 285	Liberty, The Stanford Seed Co., Buffalo, N. Y.,	J. H. Brown & Son, Mt. Pleasant,	99.57	.....	.....	0.25	0.25	.....
A 239	Liberty, The Stanford Seed Co., Buffalo, N. Y.,	Port Allegany Milling Co., Port Allegany,	99.50	.....	.....	0.09	0.13	.....
A 286	Honor, The Stanford Seed Co., Buffalo, N. Y.,	Quarryville Farmers' Ass'n., Quarryville,	99.33	.....	.....	0.10	0.42	.....
A 450	..... Western Grains Co., Unknown,	Mike Duyava, New Salem,	99.43	.....	.....	0.21	0.42	.....
A 343	Pan-American, Whitney-Eckstein Seed Co., Buffalo, N. Y.,	A. J. Steele, Latrobe,	99.37	.....	.....	1.16	1.43	.....
A 343	Imperator, Whitney-Eckstein Seed Co., Buffalo, N. Y.,	The Philip Donahy Hardware and Supply Co., Latrobe,	97.43	.....	.....	0.75	0.39	.....
A 347	Pan-American, Whitney-Eckstein Seed Co., Buffalo, N. Y.,	L. A. Fisher & Co., Bradford,	98.95	.....	.....	0.17	0.11	.....
A 347	Gold Medal, Whitney-Eckstein Seed Co., Buffalo, N. Y.,	F. O. Ackley, Westcheater,	98.72	.....	.....	0.86	0.33	.....
A 408	Dilworth's Best, Unknown,	Dilworth Brothers Co., Pittsburgh,	.....	.....	.....	0.46	0.40	.....
A 286	..... The Albert Dickinson Seed Co., Chicago, Ill.,	John Thomas & Sons, Johnstown,	98.39	.....	.....	0.53	0.08	.....
A 300	Beardless, The I. W. Scott Co., Pittsburgh, Pa.,	The I. W. Scott Co., Pittsburgh,	98.01	.....	.....	1.87	0.12	.....
A 308	..... The I. W. Scott Co., Pittsburgh, Pa.,	Average,	98.70	.....	.....	1.20	0.10	.....
A 308	Blue Stem Spring, The I. W. Scott Co., Pittsburgh, Pa.,	The I. W. Scott Co., Pittsburgh,	99.49	.....	.....	0.47	0.04	.....
A 364	Scottish Chief, Harvey Seed Co., Buffalo, N. Y.,	John G. Simpson, Huntingdon,	99.55	.....	.....	0.23	0.23	.....
A 251	Harvey Seed Co., Buffalo, N. Y.,	Emporium Milling Co., Emporium,	97.34	.....	.....	2.27	0.39	.....
A 257	Sweedish, Scobie & Parker Co., Pittsburgh, Pa.,	Scobie & Parker Co., Pittsburgh,	98.95	.....	.....	0.92	0.13	.....
A 237	Alberta, The I. W. Scott Co., Pittsburgh, Pa.,	The I. W. Scott Co., Pittsburgh,	98.77	.....	.....	0.01	0.22	.....
A 237	Montana, The I. W. Scott Co., Pittsburgh, Pa.,	The I. W. Scott Co., Pittsburgh,	97.70	.....	.....	1.24	1.56	.....
A 238	Canadian White, The I. W. Scott Co., Pittsburgh, Pa.,	The I. W. Scott Co., Pittsburgh,	97.77	.....	.....	2.15	0.08	.....
A 238	Seed, Whitney-Eckstein Seed Co., Buffalo, N. Y.,	F. O. Ackley, Westfield,	98.39	.....	.....	0.59	0.02	.....
A 254	.....	Average,	99.66	.....	.....	0.19	0.15	.....
A 301	Spring, The I. W. Scott Co., Pittsburgh, Pa.,	The I. W. Scott Co., Pittsburgh,	98.53	.....	.....	1.05	0.37	.....
A 415	..... J. Bolziano & Son, Baltimore, Md.,	Lansom Brothers, Tionesta,	98.98	.....	.....	1.00	0.02	.....
A 218	Churchill Grain and Seed Co., Toledo, Ohio,	Sachter Hardware Co., Reading,	98.00	.....	.....	2.79	0.61	1-9,100
A 424	Churchill Grain and Seed Co., Toledo, Ohio,	Leonard Ritter, St. Marys,	99.0	.....	.....	0.33	1.46	.....
A 325	Royal, Craze Brothers, Toledo, Ohio,	H. L. Orr, Tyrone,	98.23	.....	.....	0.94	1.21	.....
A 334	Pine Tree, Craver-Dickinson Seed Co., Buffalo, N. Y.,	Waite & McClain, Tyrone,	98.45	.....	.....	1.98	1.79	.....
A 334	.....	Average,	98.45	.....	.....	0.43	1.12	.....

BARLEY.

SPELT.

WHEAT.

OATS.

RYE.

ALSIKE CLOVER.

TABLE II—RESULTS OF TESTS ON SAMPLES COLLECTED IN 1915—Continued.

Analyt's number.	Name of Seed and Name and Address of Grower or Seedman.	Name and Address of Dealer.		Pure Seed.		Foreign seed.	Inert matter.	Seeds of dodder.	Seeds of Canada thistle.
		Found.	Guaranteed.	Per ct.	Per ct.				
A 234	Pine Tree, Craver-Dickinson Seed Co., Buffalo, N. Y.,			Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.
A 235	Craver-Dickinson Seed Co., Buffalo, N. Y.,	96.59	96.59	0.67	0.44	1-6,300			
A 236	Pine Tree, The Albert Dickinson Seed Co., Chicago, Ill.,	96.88	96.88	3.16	0.96				
A 238	The Albert Dickinson Seed Co., Chicago, Ill.,	98.17	98.17	1.61	0.82				
A 248	Ace Brand, The Albert Dickinson Seed Co., Chicago, Ill.,	96.06	96.06	4.43	0.50				
A 269	Ace Brand, The Albert Dickinson Seed Co., Chicago, Ill.,	92.86	92.86	6.91	0.20				
A 304	Ace Brand, The Albert Dickinson Seed Co., Chicago, Ill.,	96.66	96.66	2.94	0.50				
A 374	H. W. Dougherty, New York, N. Y.,	97.34	97.34	3.30	0.38	1-25,500			
A 234	O. Gandy & Co., South Whitley, Ind.,	98.49	98.49	2.24	0.59				
A 413	Henry Hursh, Toledo, Ohio,	97.70	97.70	1.22	0.29				
A 297	The Philadelphia Seed Co., Philadelphia, Pa.,	91.89	91.89	1.68	0.72				
A 216	The Philadelphia Seed Co., Philadelphia, Pa.,	96.24	96.24	4.56	0.56	1-36,000			
A 231	The Philadelphia Seed Co., Philadelphia, Pa.,	96.53	96.53	3.26	0.51				
A 406	W. G. Scarlett & Co., Baltimore Md.,	97.49	97.49	2.09	0.73				
A 401	Walter S. Schell, Harrisburg, Pa.,	96.89	96.89	1.64	0.49				
A 270	Scobie & Parker Co., Pittsburgh, Pa.,	98.39	98.39	4.00	0.11				
A 282	Special The I. W. Scott Co., Pittsburgh, Pa.,	99.38	99.38	0.40	0.32	1-80,000			
A 283	AAA, W. A. Standard Seed Co., Buffalo, N. Y.,	99.30	99.30	1.04	0.66				
A 284	Reliable, The Standard Seed Co., Buffalo, N. Y.,	99.22	99.22	0.19	0.69				
A 213	Reliable, The Standard Seed Co., Buffalo, N. Y.,	97.77	97.77	1.96	0.27				
A 307	Choice, The Standard Seed Co., Buffalo, N. Y.,	98.43	98.43	0.79	0.67				
A 316	Pearl Brand, Toledo Field Seed Co., Toledo, Ohio,	98.53	98.53	0.75	0.67				
A 349	Western Grain Co., Unknown,	97.23	97.23	2.43	0.28				
A 322	Western Grain Co., Unknown,	96.63	96.63	2.83	1.54				
A 225	Pan-American, Whitney-Eckstein Seed Co., Buffalo, N. Y.,	96.66	96.66	0.88	2.96				
A 240	Imperator, Whitney-Eckstein Seed Co., Buffalo, N. Y.,	98.23	98.23	2.94	0.43				
A 245	Pan-American, Whitney-Eckstein Seed Co., Buffalo, N. Y.,	90.96	90.96	1.60	0.22				
A 245	Imperator, Whitney-Eckstein Seed Co., Buffalo, N. Y.,	96.62	96.62	7.60	1.44				
A 354	Fancy, Whitney-Eckstein Seed Co., Buffalo, N. Y.,	96.52	96.52	2.60	0.93	1-82,500			
A 363	Unknown,	96.90	96.90	3.77	0.28				
A 307	Unknown,	98.23	98.23	1.62	0.29				
A 351	Unknown,	97.86	97.86	1.62	0.52				
A 351	Average,	97.04	97.04	2.25	0.71				

PERENNIAL RYE GRASS.									
A 278	.....	Scoble & Parker Co., Pittsburgh, Pa.,	Scoble & Parker Co., Pittsburgh,	95.35	.....	1.51	.....	2.74	.....
GERMAN MILLET.									
A 284	.....	Craver-Dickinson Seed Co., Buffalo, N. Y.,	Blank & Gottshall, Sunbury,	96.60	.....	0.50	.....	0.51	.....
A 287	.....	The Albert Dickinson Seed Co., Chicago, Ill.,	John Thomas & Sons, Johnstown,	99.08	.....	0.74	.....	0.23	.....
A 288	.....	Wm. G. Scarlett & Co., Baltimore, Md.,	Rochester Seed and Supply Co., Rochester,	99.31	.....	0.55	.....	0.14	.....
A 284	.....	Southern Tennessee or Golden, The I. W. Scott Co., Pitts- burgh, Pa.,	The I. W. Scott Co., Pittsburgh,	99.22	.....	0.13	.....	0.66	.....
A 286	XXX,	The I. W. Scott Co., Pittsburgh, Pa.,	The I. W. Scott Co., Pittsburgh,	99.63	.....	0.35	.....	0.13	.....
HUNGARIAN MILLET.									
A 290	.....	The I. W. Scott Co., Pittsburgh, Pa.,	Average,	99.16	.....	0.51	.....	0.33	.....
A 294	.....	The Stanford Seed Co., Buffalo, N. Y.,	The I. W. Scott Co., Pittsburgh,	99.13	.....	0.63	.....	0.19	.....
A 290	.....	Unknown,	J. O. Reed, Philadelphia,	97.76	.....	2.05	.....	0.19	1-3,000
A 288	.....	Unknown,	Blank & Gottshall, Sunbury,	98.56	.....	1.19	.....	0.35	.....
COMMON MILLET.									
A 341	Yellow,	The Stanford Seed Co., Buffalo, N. Y.,	Average,	98.48	.....	1.31	.....	0.21	.....
WHITE CLOVER.									
A 221	.....	The Albert Dickinson Seed Co., Chicago, Ill.,	J. O. Reed, Philadelphia,	99.22	.....	0.47	.....	0.31	.....
A 225	.....	Walter S. Schell, Harrisburg, Pa.,	Stichter Hardware Co., Reading,	92.04	91.9	6.14	.....	1.82	.....
A 224	.....	Scoble & Parker Co., Pittsburgh, Pa.,	Walter S. Schell, Harrisburg,	97.91	.....	1.15	.....	0.94	.....
A 224	.....	The I. W. Scott Co., Pittsburgh, Pa.,	Scoble & Parker Co., Pittsburgh,	90.92	.....	8.11	.....	0.97	.....
A 230	.....	Special, The I. W. Scott Co., Pittsburgh, Pa.,	The I. W. Scott Co., Pittsburgh,	91.76	.....	1.46	.....	0.73	.....
A 350	Prime,	The Stanford Seed Co., Buffalo, N. Y.,	L. A. Fischer & Co., Bradford,	91.72	.....	6.95	.....	1.33	.....
RED TOP GRASS (Hulled).									
A 314	.....	The Albert Dickinson Seed Co., Chicago, Ill.,	Average,	94.07	.....	4.76	.....	1.17	.....
A 322	Fancy	Jacot & Muller, New York, N. Y.,	The Loucks Hardware Co., Scottsdale,	95.45	.....	1.34	.....	3.20	.....
A 322	Fancy	Reclenched, The I. W. Scott Co., Pittsburgh, Pa.,	Stichter Hardware Co., Reading,	88.82	91.32	9.46	.....	1.72	.....
A 321	.....	The Stanford Seed Co., Buffalo, N. Y.,	The I. W. Scott Co., Pittsburgh,	91.02	.....	1.64	.....	7.34	.....
A 328	.....	Unknown,	L. A. Fischer & Co., Bradford,	90.42	.....	1.68	.....	7.90	.....
A 328	.....	Unknown,	A. M. Weltmer's Sons, Lebanon,	96.37	.....	0.83	.....	3.25	.....
CANADIAN BLUE GRASS.									
A 257	.....	Whitney-Eckstein, Seed Co., Buffalo, N. Y.,	Average,	92.42	.....	2.90	.....	4.63	.....
ORCHARD GRASS.									
A 212	.....	Illinois Seed Co., Chicago, Ill.,	C. H. Miller Hardware Co., Huntingdon,	88.06	.....	1.73	.....	10.23	1-15,000
A 276	.....	Scoble & Parker Co., Pittsburgh, Pa.,	The Loucks Hardware Co., Scottsdale,	79.73	.....	0.13	.....	20.09	.....
A 233	Special,	The I. W. Scott Co., Pittsburgh, Pa.,	Scoble & Parker Co., Pittsburgh,	79.97	.....	2.60	.....	13.33	.....
A 233	.....	.....	The I. W. Scott Co., Pittsburgh,	81.27	.....	0.69	.....	13.04	.....

TABLE II—RESULTS OF TESTS ON SAMPLES COLLECTED IN 1915—Concluded.

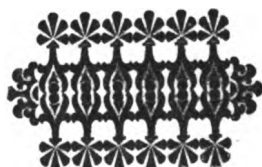
Analyt's number.	Name of Seed and Name and Address of Grower or Seedman.	Name and Address of Dealer.	Pure Seed.		Foreign seed.	Inert matter.	Seeds of dodder.	Seeds of Canada thistle.
			Found.	Guaranteed.				
A 319 A 308	The Stanford Seed Co., Buffalo N. Y., Unknown,	King Brothers, Uniontown, A. M. Weltner & Sons, Lebanon, Average,	Per ct. 80.16 79.84	Per ct.	Per ct. 1.88 10.86	Per ct. 14.76 10.11	Per ct.	Per ct.
KENTUCKY BLUE GRASS.								
A 224 A 276 A 291 A 346 A 358 A 313	The Albert Dickinson Seed Co., Chicago, Ill., Scoble & Parker Co., Pittsburgh, Pa., Fancy, The I. W. Scott Co., Pittsburgh, Pa., The Stanford Seed Co., Buffalo, N. Y., Whitney-Eckstein Seed Co., Buffalo, N. Y., Unknown,	Stichter Hardware Co., Reading, Scoble & Parker Co., Pittsburgh, The I. W. Scott Co., Pittsburgh, L. A. Fischer & Co., Bradford, C. H. Miller Hardware Co., Huntingdon, The Loucks Hardware Co., Scottsdale, Average,	Per ct. 79.22 74.48 85.46 76.19 80.87 80.67	Per ct. 84.0	Per ct. 0.49 1.59 0.17 0.53 0.88 25.98	Per ct. 20.29 23.96 14.87 22.23 18.35 13.40	Per ct.	Per ct. 1-128000

TABLE III—AVERAGE PURITY OF OFFICIAL SAMPLES.

Name of Seed.	Number of samples.	Standard of purity.	Pure seed.	Foreign seed.	Inert matter.
		Per ct.	Per ct.	Per ct.	Per ct.
Red clover,	74	97	98.67	0.89	0.44
Crimson clover,	2	97	98.18	1.32	0.50
Alfalfa,	23	97	99.11	0.67	0.22
Timothy-grass,	42	97	99.14	0.46	0.40
Barley,	2	97	98.70	1.20	0.10
Spelt,	1	97	99.49	0.47	0.04
Wheat,	1	97	99.55	0.23	0.22
Oats,	7	97	98.58	1.05	0.37
Rye,	1	97	98.98	1.00	0.62
Alsike clover,	37	96	97.04	2.25	0.71
Perennial rye-grass,	1	95	96.35	1.91	2.74
German millet,	5	95	99.16	0.51	0.33
Hungarian millet,	3	95	98.48	1.31	0.21
Common millet,	1	90	99.22	0.47	0.31
White clover,	5	90	94.97	4.78	1.17
Redtop grass (bulled),	5	85	92.42	3.90	4.68
Canadian blue-grass,	1	75	88.06	1.72	10.22
Orchard grass,	5	75	83.02	3.07	14.91
Kentucky blue-grass,	6	75	76.14	4.94	18.92
Total,	221

TABLE IV—SHOWING

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BULLETIN No. 277

TABULATED ANALYSES OF

Commercial Fertilizers

FROM SAMPLES SELECTED IN ACCORDANCE
WITH ACT OF MAY 1, 1909

BY THE

PENNSYLVANIA DEPARTMENT OF AGRICULTURE

From August 1 to December 31, 1915

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1916

OATH OF FERTILIZER SAMPLING AGENT.

Commonwealth of Pennsylvania, ss:

Personally appeared before me,
of.....County of.....and State
of Pennsylvania, who being duly sworn, according to law, doth de-
pose and say: That he has been duly appointed an agent of the De-
partment of Agriculture of Pennsylvania to collect samples of Com-
mercial Fertilizers for analysis, that he is not in any way interested
in the manufacture or sale of any fertilizer, and that he will per-
form the duties of the office with fidelity in accordance with the
requirements of law to the best of his ability, and as set forth in the
instructions issued by the Secretary of the Department of Agricul-
ture, governing the sampling of fertilizers in this State.

Sworn and subscribed before me, this }
.....day of..... }
A. D..... } (Signed),.....
..... }
..... }

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF AGRICULTURE

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A summary of the analyses made this season may be presented as follows:

Summary of Analyses Made This Season.

	Complete fertilizers.	Rock and potash.	Dissolved bone.	Dissolved rock.	Ground bone.
Number of analyses,	288	46	32	39	21
Moisture, per cent.,					
Phosphoric acid:					
Total, per cent.,	10.41	12.07	12.35	16.02	23.03
Available,	9.11	11.08	10.33	15.13	
Insoluble,	1.30	.99	3.02	.89	
Potash,	1.94	1.87			
Nitrogen,	1.28		1.36		3.13
Mechanical Analyses of Bone:					
Fine,					52
Coarse,					48
Commercial valuation,	23.13	15.75	19.32	19.41	33.56
Average selling price,	21.79	16.89	21.52	13.63	32.79

The potash stringency due to the European war, has resulted in a further decrease in the amounts of potash salts used in mixed fertilizers.

The average potash percentages, commercial valuations and selling prices, for the brands analyzed in the Fall Season, of 1913, 1914 and 1915, are as follows:

	1913.		1914.		1915.	
	Complete.	Rock and potash.	Complete.	Rock and potash.	Complete.	Rock and potash.
Potash, per cent.,	4.28	4.70	3.42	3.50	1.94	1.87
Commercial valuations,	\$24.86	\$16.85	\$23.64	\$15.42	\$23.13	\$15.75
Average selling price,	\$21.53	\$16.15	\$20.83	\$15.21	\$21.79	\$16.89

There is a steady decrease in the brands on the market in which potash continues to be as part of the mixture. There is, however, no great increase in the prices asked for the potash used.

The remarkable increase in the number of brands appearing under the heading "Dissolved Bone" is doubtless due to the present potash scarcity. It will appear, upon an examination of the brand names of

this group, that many of these fertilizers are not sold as "dissolved bone" strictly. The grouping has been temporarily enlarged to include all fertilizers, not containing potash, that furnish available phosphoric acid and nitrogen.

It is of interest to note how closely the series of valuations based upon the wholesale price of raw materials in the principal markets during the most important buying season and upon certain average allowances for expenses and profits on the part of the mixer and jobber, coincides with the retail prices later ascertained. A comparison for several seasons past is given below :

Comparison of Selling Price and Valuation, 1911-1915.

	Selling price.	Valuation.	Excess of valuation over selling price.
Complete fertilizers:			
1911, Spring,	24.97	25.95	.98
Fall,	21.73	22.33	.61
1912, Spring,	27.64	27.24	-.40
1913, Spring,	25.08	26.44	1.36
Fall,	21.92	24.36	2.44
1914, Spring,	24.72	26.36	2.21
Fall,	20.63	22.64	1.81
1915, Spring,	25.50	26.46	.96
Fall,	21.79	23.13	1.34
Dissolved bone:			
1911, Spring,	20.33	22.32	2.40
Fall,	24.89	21.51	-3.37
1912, Spring,	20.94	19.82	-2.82
1913, Spring,	18.55	21.63	3.08
Fall,	24.75	24.26	-.49
1914, Spring,	26.25	27.29	1.06
Fall,	16.05	19.02	2.97
1915, Spring,	24.69	24.30	-.30
Fall,	21.52	18.32	-3.20
Rock and potash:			
1911, Spring,	17.05	15.99	-1.06
Fall,	16.25	16.97	.72
1912, Spring,	18.17	15.26	-2.91
1913, Spring,	16.75	16.52	-.23
Fall,	16.25	16.95	.60
1914, Spring,	16.79	15.60	-1.19
Fall,	15.21	15.42	.21
1915, Spring,	16.90	16.47	-.43
Fall,	16.89	15.75	-1.14
Dissolved rock:			
1911, Spring,	15.82	14.26	-1.56
Fall,	14.00	13.73	-.27
1912, Spring,	14.69	14.20	-.49
Fall,	12.51	13.70	1.19
1914, Spring,	14.45	13.71	-.74
Fall,	13.73	13.97	.24
1915, Spring,	14.00	13.97	-.03
Fall,	12.89	12.41	-.48
Ground bone:			
1911, Spring,	30.93	31.47	.54
Fall,	31.17	31.18	.01
1912, Spring,	32.81	33.26	.45
1913, Spring,	33.86	32.50	-1.36
Fall,	31.12	32.63	1.51
1914, Spring,	31.43	30.15	-1.28
Fall,	32.30	33.45	1.15
1915, Spring,	33.44	30.26	-3.18
Fall,	32.79	33.56	.77

MATERIALS USED IN FERTILIZERS.

The sampling agents report no case of declaration under the requirements of Section 4 of the fertilizer law, nor has microscopic examination shown any decisive evidence of the presence in any fertilizer of more than accidental traces of any of the substances specified in that section.

On the other hand the results of the examination of the condition of the nitrogen in the complete fertilizers by the alkaline permanganate method affords much that is suggestive.

To keep the tables down to convenient size, the percentages of active insoluble nitrogen found have been omitted. They can be computed, however, from the figures given, by deducting from the total nitrogen the sum of the soluble and the inactive insoluble nitrogen. The ratio which the active insoluble bears to the inactive insoluble nitrogen being the principal indication the method as here used gives respecting the character of the organic nitrogenous ingredients of the fertilizer, the index letters, 'a', 'b' and 'c' have been affixed to the percentages of inactive insoluble nitrogen, to indicate the ratios between the active and inactive insoluble in the several samples. Cases in which the active constitutes three-fifths or more of the insoluble are marked 'a'; two-fifths to three-fifths, 'b', and less than two-fifths 'c'. The New England Stations use the terms 'good,' 'doubtful' and 'poor' for these respective classes of cases.

Of the 233 samples examined this season, 49 belong to class 'a', 159 to 'b', and 54 to 'c'.

If it is needful to keep clearly in mind the meaning of the index 'c' as thus applied. Its presence does not suffice to indicate that the fertilizer contains no readily available nitrogen, but merely that part or all of the insoluble nitrogen is derived from low-grade sources, barring cases in which cyanamid is one of the fertilizer ingredients. These low grade materials may be such as are listed in Section 4 of the law, or others in common use, such as garbage tankage, peat or mora meal; and they may, if of animal origin, have had their nitrogenous material changed almost entirely to an available condition by 'wet mixing,' which has, however, little improving effect upon the nitrogenous constituents of garbage tankage and mora meal, and little more upon those of peat.

The use of such low-grade materials is either to make the fertilizer less likely to become sticky or lumpy, or to supply nitrogen from material that would otherwise be wholly thrown to waste. The use of 'conditioners' for the former purpose is, in itself, desirable rather than objectionable; but becomes obnoxious and unjust when the nitrogen they contain in unavailable form is made the basis of a charge at high rate to the buyer. The use also of low-grade and

therefore cheap nitrogen supplies whose nitrogen has, by chemical treatment, been made useful for plant-food, is laudable provided the materials are sold for what they are.

In cases where the inactive insoluble nitrogen forms a large fraction of the total nitrogen, and is marked by the index 'c,' and where also the guaranty does not exceed the available nitrogen by an amount equal to most of the 'inactive,' and the selling price, corrected for freight difference, is not considerably less than that asked for fertilizers of like general composition but supplying nitrogen derived from high-grade goods such as bear the index 'a' or even 'b' there is reason to believe that the buyer is being subjected to unfair treatment.

Section 1 of the Fertilizer Law of 1909 requires that the guaranty for a fertilizer shall state 'the percentage such fertilizer contains of nitrogen in an available form.' It is, however, by no means clear that the term 'available,' as used in the law, means precisely the same thing that is meant by the term when used to designate the sum of water soluble and active insoluble nitrogen, as determined by the present method. For some nitrogenous fertilizer ingredients always regarded as of high grade, such as dried blood, meat tankage, and cottonseed meal, contain a considerable fraction of inactive insoluble nitrogen when examined by this method. Until further notice, therefore, the law will not be construed to require that the amount of nitrogen guaranteed shall not exceed that present in a form that will appear as 'available' by the alkaline permanganate method now in use.

In many of this season's samples, however, the quantity of nitrogen thus available is found equal to the percentage guaranteed. On the average, the 'available' nitrogen found was 1.49 per cent., the total, 1.81 that guaranteed, 1.69 per cent.

ORGANIZATION OF THE WORK.

The work of the season has been performed under my direction as follows:

The nitrogen determinations, total, by G. C. Given, Ph.D.; available, by A. B. Long, B. S.; the total phosphoric acid and moisture, by G. J. Kuhlman, B. S.; the insoluble phosphoric acid, by F. J. Holben, B. S., and C. A. Kern; the potash and chlorine, by E. S. Erb, M. S.; the computations M. Verna Bryce and others. Dr. G. C. Given had charge of the reception and preparation of samples, and immediate supervision of analytical work. To all these assistants the writer is indebted for loyal aid.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
THE AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK.			
73		Greencastle Elevator Co., Greencastle.	
11	†Dead Shot Phosphate,	H. N. Orr, Tyrone,	7.53
186		N. T. Sassaman, Ottaville,	
768	Grain Grower No. 1,	N. R. Yost, Myerstown,	8.30
177	†Grain Grower No. 3,	John A. Weisel, Hagersville,	
626		Hartwell & Phillips, New Wilmington,	6.67
598	Canton Chem. Special Resurgam Guano,	Irvin E. Mangel, Mahanoy City,	7.60
610	Bradley's Special B. D. Guano,	Geo. Off & Sons, Evans City,	4.25
384	†Bradley's Niagara Phosphate,	A. W. Sandt, Martins Creek,	4.68
609		Geo. Off & Sons, Evans City,	
329	Canton Chemical Baker's Fish Guano,	J. O. Wallis, Danville, R. D. No. 6,	9.39
441	Canton Chemical Harrow Brand Crop Grower,	Mark Hiltelbettel, Green Lane,	9.58
14	Canton Chemical Baker's Standard H. G. Guano,	W. B. Winey, Middleburg,	10.76
612	Crocker's Complete Manure,	Crowl & Greenleaf, Quarryville,	8.48
175	†Revised High Grade Special,	John A. Weisel, Hagersville,	8.90
230		Jerome Herb, Pitman,	
611	Crocker's New Rival Fertilizer,	Crowl & Greenleaf, Quarryville,	9.79
176	†Crocker's Nobsque Guano,	John A. Weisel, Hagersville,	6.68
515		E. E. Tribbey, West Middlesex,	
645	†Great Eastern Wheat Special,	C. E. Rauscher, Blossburg,	7.25
322		Wm. J. Johnston, Sinking Spring,	
729		Wm. T. Hoover, Port Matilda,	
408	†Detrick's Imperial Compound,	Levi Berkey, Somerset,	8.84
749		Geo. Hocker, Union Deposit,	
507	†Detrick's Paragon Ammoniated Phosphate and potash,	Levi Berkey, Somerset,	9.88
750		Geo. Hocker, Union Deposit,	
644	Detrick's Royal Crop Grower,	A. M. Grove & Co., Muddy Creek Forks,	10.17
546	Lazaretto Crop Grower,	A. M. Grove & Co., Muddy Creek Forks,	9.57
227		Samuel Helm, Pitman,	
246	†Maryland Ammoniated Phosphate,	Paxton Flour & Feed Co., Bowmansdale,	10.30
812		G. E. Kemp, Bally,	10.15
601	Milcom's Bison Brand,	D. R. Steln, Owingsburg,	11.07
854	Milcom's Special Buffalo Guano,	J. K. Diffeffer, York,	11.48
638	Milcom's Erie King Fertilizer,	Graham Bros., Darlington,	5.50
602	Moro Phillip's C. & G. Complete Fertilizer,	James Dreher, Owingsburg,	9.12
268		Nickles & Stuart, Shippensburg,	
248	†Moro Phillip's Farmers' Phosphate,	Levi Donkle, Myerstown, R. D. No. 5,	9.20
430		J. R. Diffeffer, York,	
566		W. M. Woods, Carlisle, R. D. No. 8,	
429	†Moro Phillip's Pure Phaine,	I. J. Tustin, Phoenixville,	9.30
742		Hegins Grange No. 1242, A. A. Schwaln, Sec., Hegins,	
300	Northwestern Special Shawnee Phosphate,	Elmer Carl, Coopersburg,	11.24
857	Northwestern Success Phosphate,	Francis Baker, Everett,	8.25
343	Fackers' Union Special Universal Fertilizer,	Wm. I. Brown, Ayredale,	8.99
301	Quinnipiac Mohawk Fertilizer,	Elmer Carl, Coopersburg,	8.39
814	Read's All Crop Fertilizer,	Amos Pennepacker, Bally,	10.57
635		Billings & Keldar, New Albany,	
380	†Read's Special Wheat and Rye,	Robert A. Daubach, Nazareth,	9.07
815		Amos Pennepacker, Bally,	
816	Read's Leader Fertilizer,	Amos Pennepacker, Bally,	9.48
381	†Read's Pioneer Fertilizer,	Robert A. Daubach, Nazareth,	8.61
817		Amos Pennepacker, Bally,	
746	Reese's Ammoniated Phosphate Mixture,	Jacob Yoder, Hegins,	10.40
419	Reese's Half and Half,	Wm. Hall, Danboro,	9.20
757		A. G. Houtz, Myerstown, D. No. 3,	
144	Reese's Harvest Queen,	J. F. Goodling, Loganville,	10.11
464	Susquehanna Animal Phosphate,	H. P. Pasmore & Bro., Oxford,	10.60
16	†Susquehanna Crop Grower,	C. H. Kingler, Middleburg, R. D.,	8.61
713		The J. N. Getz Co., Lock Haven,	
439		A. H. Keeley & Sons, Schwenksville,	
712	†Susquehanna XXV Phosphate,	The J. N. Getz Co., Lock Haven,	9.52

†Composite sample.

*Constituent falls below guaranty.

FERTILIZERS.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs. at point of selection.
Available.			Total.		Present as Muriate.	Present as Sulphate.	Total.		Water Soluble.	Available.	Inactive Insoluble.	Total.			
Found.	Guaranteed.	Insoluble.	Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
8.32	8.00	.83	9.15	9.00	1.94	.....	1.94	2.00	.34	.43	b.13	.56	.41	16.58	19.00
9.59	9.00	.97	10.56	10.00	.88	.....	.88	1.00	.43	.61	a.07	*.68	.82	13.52	19.50
9.16	9.00	1.37	10.53	10.00	.98	.....	.98	1.00	1.17	1.42	b.23	1.65	1.65	22.88	20.00
8.26	8.00	.90	9.16	9.00	2.90	.....	2.90	3.00	.62	.91	a.16	1.07	.82	23.98	25.00
*7.61	8.00	1.75	9.36	9.00	2.72	.....	*2.72	3.00	.68	.86	a.13	.89	.82	22.15	25.00
7.02	7.00	1.47	8.49	8.00	1.08	.....	1.08	1.00	.52	.75	b.19	.94	.82	18.01	17.25
*7.72	8.00	1.59	9.31	9.00	2.18	.....	2.18	2.00	1.14	1.45	b.23	1.67	1.65	24.11	26.00
8.10	8.00	1.21	9.31	9.00	1.10	.....	1.10	1.00	.72	.88	b.12	1.00	.82	19.08	23.00
8.63	8.00	1.46	10.09	9.00	3.34	.....	3.34	3.00	1.45	1.73	b.23	1.96	2.06	29.62	29.00
8.37	8.00	.87	9.24	9.00	3.04	.....	3.04	3.00	.50	.69	b.16	.85	.82	22.47	21.00
8.06	8.00	1.23	9.28	9.00	2.83	.....	2.83	3.00	1.00	1.28	b.25	1.53	1.65	25.14	26.25
8.59	9.00	2.12	10.71	10.00	1.92	.....	1.92	2.00	.82	.98	b.23	1.21	1.23	22.50	25.00
8.34	8.00	1.28	9.62	9.00	2.04	.....	2.04	2.00	.84	1.14	a.20	1.34	1.03	23.36	22.00
8.07	8.00	1.66	9.73	9.00	2.04	.....	2.04	2.00	1.07	1.45	a.24	1.69	1.65	24.48	27.00
8.16	8.00	1.12	9.28	9.00	2.70	.....	2.70	2.00	.56	.68	b.18	.86	.82	21.69	24.00
7.53	7.00	1.30	8.83	8.00	1.26	.....	1.26	1.00	.58	.74	b.17	.91	.82	18.48	19.00
7.93	8.00	1.77	9.70	9.00	1.94	.....	1.94	2.00	1.25	1.49	b.23	1.77	1.65	24.38	23.00
8.16	8.00	1.50	9.66	9.00	2.02	.....	2.02	2.00	1.12	1.36	b.28	1.64	1.65	24.06	25.00
8.47	8.00	1.28	9.75	9.00	3.04	.....	3.04	3.00	1.08	1.38	b.25	1.58	1.65	25.18	26.00
7.92	8.00	1.13	9.05	9.00	1.74	.....	*1.74	2.00	.65	.81	b.12	.93	.82	19.97	25.00
10.08	10.00	1.05	11.13	11.00	1.95	.....	1.95	3.00	1.07	1.40	b.25	1.65	1.65	29.68	24.00
8.69	8.00	1.61	10.30	9.00	3.08	.....	3.08	3.00	.66	.77	b.14	.91	.82	28.48	.....
*6.67	7.00	2.00	8.67	8.00	.94	.....	.94	1.00	.40	.61	b.20	.81	.82	16.94	23.00
7.99	8.00	1.38	9.37	9.00	1.68	.....	*1.68	2.00	.73	.97	b.14	1.01	.82	20.25	20.75
7.28	7.00	1.06	8.26	8.00	.99	.....	.99	1.00	.57	.71	b.21	.99	.82	17.69	18.00
8.51	8.00	1.34	9.75	9.00	2.84	.....	2.84	3.00	1.01	1.25	b.29	1.54	1.65	25.55	25.00
8.66	8.00	1.03	9.69	9.00	2.91	.....	2.91	3.00	1.04	1.42	a.34	1.66	1.65	26.18	24.00
7.22	7.00	.99	8.21	8.00	1.10	.....	1.10	1.00	.45	.62	b.24	.86	.82	17.48	25.00
8.80	8.00	.98	9.78	9.00	2.08	.....	2.08	2.00	.62	.66	b.20	.86	.82	20.96	18.50
8.62	7.00	.70	9.22	8.00	1.28	.....	1.28	1.00	.66	.88	a.12	1.00	.82	19.60	18.00
9.25	9.00	1.31	10.56	10.00	2.59	.....	*2.59	3.00	.53	.65	b.08	.73	.82	22.08	23.50
8.45	8.00	1.23	9.68	9.00	3.33	.....	3.33	3.00	1.02	1.26	b.33	1.61	1.65	26.74	25.25
7.19	7.00	1.11	8.30	8.00	.90	.....	.90	1.00	.59	.76	b.16	.92	.82	17.14	18.50
8.12	8.00	1.21	9.43	9.00	2.33	.....	2.33	2.00	.63	.80	b.15	.96	.82	21.59	18.50
9.42	9.00	1.58	10.95	10.00	2.73	.....	*2.73	3.00	.59	.76	b.18	.98	.82	23.32	20.00
7.37	7.00	1.11	8.48	8.00	1.58	.....	1.58	1.00	.63	.80	b.18	.98	.82	19.41	20.00
8.28	8.00	1.78	10.14	9.00	2.40	.....	2.40	2.00	.95	1.14	b.19	1.33	1.03	23.83	20.50
9.19	9.00	2.41	11.60	10.00	3.34	.....	3.34	2.00	1.09	1.50	a.27	1.77	1.65	28.61	.....
7.84	7.00	1.21	8.55	8.00	1.06	.....	1.06	1.00	.61	.75	b.21	.96	.82	18.07	19.00
7.98	8.00	1.26	9.34	9.00	.99	.....	.99	1.00	.62	.73	b.17	.90	.82	18.39	21.00
															23.00
															24.00

a b c characters indicating the proportion of insoluble nitrogen that is inactive: a=two-fifths or less; b=two-fifths to three-fifths; c=three-fifths or more.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
344	Wheeler's Royal Wheat Grower,	L. P. Garver, Shirleysburg,	10.50
312	William' & Clark Royal Phosphate,	Zehner Bros., Bloomsburg,	9.24
533	Zell's Ammoniated Superphosphate,	J. F. Goodling, Loganville,	9.61
534	Zell's Little Treasure,	J. R. Shaffer, Glen Rock, R. D. No. 1,	10.01
AMERICAN FERTILIZER CO., BALTIMORE, MD.			
337	Ammoniated Crop Compound,	N. H. Blough, Davidsville,	8.42
214	{ American Eagle Crop Grower,	S. K. Savidge, Valley View,	9.83
348	{ American Eagle Crop Grower,	Quarryville Farmers' Asso., Quarryville,	
629	{ American Eagle Guano,	Lenox Grange, Hopbottom,	9.04
112	{ American Eagle Truck and Vegetable Manure,	G. C. Myers, Gardners,	8.11
303	{ American Emergency Special Compound Guano,	S. K. Savidge, Valley View,	8.16
608	{ American Emergency Special Compound Guano,	Bert Hoff, Spring Grove, R. D.,	
207	{ American Grain and Grass Grower,	Jones Eaverson, Christiansa,	12.16
180	{ American Grain and Grass Grower,	S. K. Savidge, Valley View,	
215	{ American High Grade Special Compound Guano,	H. W. Burg, East Prospect,	8.82
205	{ American High Grade Special Compound Guano,	S. K. Savidge, Valley View,	
112	{ American Special Compound Guano, ...	G. C. Myers, Gardners,	8.76
607	{ American Special Compound Guano, ...	Jones Eaverson, Christiansa,	
ARMOUR FERTILIZER WORKS, INC., BALTIMORE, MD.			
213	{ Farmers' Choice,	C. G. Updegrave, Sacramento,	5.35
59	{ Farmers' Choice,	Grove Stove Co., West Milton,	
241	{ Grain Grower,	M. L. Bachman, Lebanon,	7.73
210	{ Grain Grower,	C. G. Updegrave, Sacramento,	
ATLANTIC FERTILIZER WORKS, BALTIMORE, MD.			
644	Atlantic Arrow Brand Special,	Chas. McDowell, Mansfield,	7.96
643	Atlantic G. G. G. Golden Grain Grower, ..	Chas. McDowell, Mansfield,	9.54
BALTIMORE FERTILIZER CO., BALTIMORE, MD.			
287	Honest Harvest,	C. W. Otto, Carlisle, R. D. No. 6, ..	6.97
119	Old Honesty,	J. N. Lightner, Gettysburg,	6.63
BAUGH & SONS CO., PHILADELPHIA, PA.			
163	{ Baugh's Double Eagle $\frac{3}{4}$ Phosphate, ...	Ed. Brinton & Sons, West Chester, ..	8.19
62	{ Baugh's Double Eagle $\frac{3}{4}$ Phosphate, ...	Cook Grain, Feed & Fert. Co., Dillsburg, ..	
289	{ Export Bone with Potash,	Adolph Bollinger, Danville,	5.97
647	{ Export Bone with Potash,	J. Harvey Miller, Ligonier,	
155	{ Baugh's General Crop Grower for all Crops,	H. A. Mendenhall, Toughkenamon, ..	8.53
100	{ Baugh's General Crop Grower for all Crops,	M. J. Sheffer, Hanover,	
280	{ Baugh's Wheat Fertilizer for Wheat and Grass,	S. E. Shenk, Newville,	7.30
161	{ Baugh's Wheat Fertilizer for Wheat and Grass,	Ed. Brinton & Sons, West Chester, ..	
6	{ Baugh's Wheat Fertilizer for Wheat and Grass,	Robt. D. Forman, Centre Hall,	7.30
470	{ Baugh's Wheat Fertilizer for Wheat and Grass,	I. J. Farabaugh, Carrolltown,	
ELIAS BRUBACHER, RICHLAND, PA.			
255	Wheat and Grass Special,	Elias S. Brubacher, Richland,	9.00
BOWKER FERTILIZER CO., BOSTON AND NEW YORK.			
762	Bowker's Ammoniated O. I. O. Phosphate, ..	I. W. Firestone & Sons, Richland, ..	9.05
444	Bowker's Hill and Drill Phosphate,	L. K. Beers, Perkaskie,	8.67
276	{ Bowker's Sure Crop Phosphate,	Jno. K. Beldier & Son, Oakville, ..	10.57
111	{ Bowker's Sure Crop Phosphate,	G. C. Myers, Gardners,	
443	{ Bowker's Sure Crop Phosphate,	L. K. Beers, Perkaskie,	10.57
	{ Bowker's Sure Crop Phosphate,	L. K. Beers, Perkaskie,	
CEN. CHEM. CO. THOMAS FERTILIZER WORKS, HAGERSTOWN, MD.			
306	C. C. C. Farmers' Century Brand,	C. L. Bernhellsel & Co., New Kensington, ..	8.88
787	{ C. C. C. Fish Bone Compound,	Jno. W. Bathgate, State College, ..	8.88
805	{ C. C. C. Fish Bone Compound,	C. L. Bernhellsel & Co., New Kensington, ..	

†Composite sample.

*Constituent falls below guaranty

FIZERS—Continued

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.				* Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs. at point of selection.	
Available.		Insoluble.	Total.		Present as Muriate.	Present as Sulphate.	Total.		Water Soluble.	Available.	Inactive Insoluble.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.			Guaranteed.
9.15	8.00	1.85	11.00	9.00	1.96	.....	1.96	2.00	.74	.87	b.17	1.04	.83	28.29	20.46
8.98	8.00	1.88	10.27	9.00	2.08	.....	2.08	2.00	.62	.96	b.33	1.26	1.03	28.33	24.00
7.88	8.00	1.57	9.46	9.00	2.36	.....	2.36	2.00	1.15	1.43	b.24	1.66	1.05	28.53	13.00
7.22	7.00	1.31	8.59	8.00	1.99	.....	1.99	1.00	.90	.79	b.21	1.00	.83	18.31	17.00
8.47	8.00	2.00	11.07	9.00	1.88	.....	1.88	2.00	.48	.61	c.21	.83	.83	20.68	20.50
8.04	8.00	.83	8.87	9.00	2.34	.....	2.34	2.00	1.20	1.38	a.11	1.49	1.65	23.67	23.00
7.88	8.00	1.00	8.88	9.00	3.51	.....	3.51	3.00	3.15	3.48	b.28	3.63	2.47	36.61	22.60
8.80	8.00	.92	9.81	9.00	2.87	.....	2.87	1.00	3.38	2.06	b.30	*2.96	3.20	32.12	21.70
7.56	7.00	1.40	9.05	8.00	.96	.....	.96	1.00	.30	.....	.....	.52	.41	13.97	31.00
9.68	9.00	1.54	11.22	10.00	3.80	.....	*2.80	3.00	.60	.69	c.17	.86	.82	29.42	22.75
7.96	7.00	1.11	8.47	8.00	3.12	.....	3.12	3.00	.54	.96	c.19	.86	.82	31.74	22.00
7.37	7.00	1.67	9.04	8.00	3.10	.....	3.10	3.00	.37	.....	.....	.51	.41	20.46	21.50
9.46	9.00	.66	10.12	9.50	1.80	.97	*2.77	3.00	.36	.58	c.28	.84	.83	23.94	22.00
8.90	8.00	1.19	10.09	8.50	1.65	.....	*1.65	2.00	.79	1.15	b.46	1.61	1.65	23.66	24.00
8.25	8.00	.76	9.01	.....	1.78	.....	1.78	1.00	.85	.94	c.26	1.20	.82	31.24	22.00
*8.79	9.00	.66	9.66	.....	2.10	.....	2.10	1.00	1.26	1.41	c.23	1.69	1.65	34.76	24.00
8.96	9.00	.54	9.49	10.00	1.20	.28	1.43	.....	.62	.82	b.29	1.17	1.00	20.76	20.00
8.00	8.00	.50	8.69	9.00	.72	.....	.72	.50	.52	.69	b.21	.94	.80	17.40	17.00
9.22	8.50	1.53	10.75	.....	1.80	.....	1.80	1.00	.78	1.08	c.54	1.57	1.65	23.10	24.00
14.12	.....	1.50	15.62	11.00	2.18	.....	2.18	2.00	.43	.96	b.59	1.57	1.65	29.37	24.50
8.87	8.00	1.28	10.13	.....	1.40	.....	1.40	1.00	.46	.61	c.31	.92	.83	19.66	19.00
10.30	10.00	2.45	12.75	.....	1.50	.....	1.50	1.00	.79	1.13	b.43	1.00	1.65	25.21	18.50
8.28	8.00	2.65	10.94	9.00	2.24	.....	2.24	2.00	.57	.72	b.22	.94	.82	23.07	20.50
*9.79	10.00	1.25	11.04	11.00	.58	.....	.58	.....	.69	.91	a.12	1.08	.62	19.74	.....
9.18	9.00	.96	10.14	10.00	1.96	.....	1.96	2.00	1.59	2.12	a.40	2.48	2.47	28.53	.....
9.12	9.00	1.47	10.59	10.00	1.92	.....	1.92	2.00	.74	.87	b.16	1.03	.83	21.06	21.00
9.96	8.00	.45	10.41	.....	1.90	.....	1.90	2.00	.44	.53	c.21	.74	.82	20.36	20.00
12.05	12.00	.86	12.91	.....	.58	.....	.58	.....	.58	.81	b.27	1.08	1.04	21.80	20.75

a b c characters indicating the proportion of insoluble nitrogen that is inactive: a=two-fifths or less; b=two-fifths to three-fifths; c=three-fifths or more.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
240	{ O. C. C. Fish Bone and Potash,	Edgar Hepler, Hepler,	{ 9.97
49		John H. Wingert, Lewisburg,	
380		Isaac Adams, Danville, R. D. No. 6,	
581		Edgar Hepler, Hepler,	
673	{ C. C. C. Golden Sheaf,	Clayton Smith, Bedford,	{ 6.00
	{ C. C. C. Keystone,		
	CHESAPEAKE CHEMICAL CO., BALTI-		
	MORE, MD.		
356	{ C. C. Co's National Crop Grower,	J. S. Hershberger, Everett,	{ 9.87
787		A. H. Ush, Millerstown,	
	THE COE MORTIMER CO., NEW YORK.		
	E. Frank Coe's Columbian Corn and Po-		
	tato Special Fertilizer.		
473	{ E. Frank Coe's Grain Grower No. 1, ...	George New, Blairsville,	{ 9.54
218		Chas. Schoffstall, Valley View,	
819		J. W. Showalter, New Holland, ...	
217		Chas. Schoffstall, Valley View,	
	E. Frank Coe's Penna. No. 1 Grain Spe-		
	cial.		
484	{ E. Frank Coe's Universal Fertilizer, ...	John W. Root, Kimberton,	{ 9.29
392		J. M. Croyle & Son, Boswell, R. D. No. 1,	
565	{ E. Frank Coe's Western New Yorker,	Adam Schoffstall, Gratz,	{ 9.71
483		John W. Root, Kimberton,	
221	{ E. Frank Coe's Wheat and Buckwheat,	Chas. Schoffstall, Valley View,	{ 8.23
498		Peter George, Palmerton, R. No. 1,	
12	{ E. Frank Coe's Wheat and Buckwheat,	Wm. Elgeser, Cocolamas,	{ 8.23
493		E. A. Berthalamew, Sclonta,	
	COLUMBIA GUANO CO., BALTIMORE, MD.		
313	Columbian Fish Phosphate and Potash, ...		
312	Columbian Olympic Guano,		
328	{ Columbian Special Grange Formula,	M. P. Whitenight, Bloomsburg, ...	{ 8.29
314		M. P. Whitenight, Bloomsburg, ...	
396		D. W. & H. W. Grove, Catawissa, ...	
	CONSUMERS CHEMICAL CORPORATION,		
	THE, NEW YORK.		
183	{ Consumers' All Crop Compound,	J. O. Snyder, Pleasant Valley,	{ 7.00
36		J. D. Greybill & Son, Belleville, ...	
227	{ Consumers' Complete Compound,	Gheen, Spigelmyer & Phleger, Antes	{ 7.77
195		Fort,	
136	{ Consumers' Pure Sure Plant Food,	W. H. Hoffman, New Tripoli,	{ 5.26
37		W. H. Hoffman, New Tripoli,	
632	{ Consumers' XXX Fish and Potash,	J. D. Greybill & Son, Belleville, ...	{ 9.81
194		R. S. Hardie, Mehoopany,	
	HENRY COPE & CO., LINCOLN UNIVER-		
	SITY, PA.		
453	{ Pure Bone Phosphate,	Lyburn Whitaker, Oxford,	{ 11.06
452		Lyburn Whitaker, Oxford,	
	JOSIAH COPE & CO., BALTIMORE, MD.		
604	{ Wheat and Grass Special,	Jones Eaverson, Christiana,	{ 9.96
676		R. C. Smith, Point,	
	JAMES G. DOWNWARD CO., THE, COATES-		
	VILLE, PA.		
747	{ All Crop Fertilizer,	A. G. Lehman, Palmyra, R. No. 2,	{ 4.28
748		Jacob L. Landis, Union Deposit, ...	
418	{ Ammoniated Phosphate,	J. W. Underwood, Ambler,	{ 5.26
579		A. G. Lehman, Palmyra, R. No. 2,	
	WALLACE DUNGAN, DOYLESTOWN, PA.		
446	Bepple Hill Home-Made Animal Mixture.		
	Wallace Dungan, Doylestown, ...		
	12.05		

†Composite sample.

*Constituent falls below guaranty.

LIZERS—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.				Computed commercial value of 2,000 lbs. at Dept. rating.		Selling price of 2,000 lbs. at point of selection.	
Available.		Insoluble.	Total.		Present as Muriate.	Present as Sulphate.	Total.		Water Soluble.	Available.	Inactive Insoluble.	Total.				
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.	Found.	Guaranteed.	
11.25	7.00	.70	11.95	.....	1.17	.....	*1.17	3.00	.54	.73	c.33	1.06	1.04	22.01	{ 29.00 21.00 20.00 19.00
*7.54	8.00	1.48	9.02	.....	.83	.....	.83	1.00	.44	.61	b.23	.84	.82	17.53	
*9.49	10.00	1.11	10.60	.....	1.20	.....	1.20	1.00	.60	.76	b.21	.97	.82	20.28	.....
8.70	8.00	1.17	9.87	8.75	2.04	.....	2.04	2.00	1.24	1.43	b.20	1.62	1.64	24.27	{ 18.00 24.00
9.02	9.00	1.46	10.48	10.00	1.94	.....	1.94	2.00	.67	.91	b.31	1.22	1.23	22.70	25.00
8.96	9.00	1.27	10.23	10.00	1.75	.....	1.75	1.00	.65	.80	b.16	.96	.82	20.96	{ 28.50 18.25 20.50 22.00
7.97	8.00	1.80	9.27	9.00	2.63	.....	*2.62	3.00	.71	.86	b.12	.98	.82	22.04	.....
8.35	8.00	1.07	9.37	9.00	2.80	.....	*2.80	3.00	1.13	1.33	b.28	1.66	1.65	25.63	{ 27.00 25.65
†8.11	9.00	1.59	*9.70	10.00	2.23	.....	*2.23	3.00	.78	.90	b.18	1.08	.82	22.17	{ 25.00 23.00
*6.22	8.00	1.09	*7.31	9.00	2.06	.....	2.06	2.00	.88	.....	.....	.56	.41	17.20	{ 20.00
*7.90	8.00	1.48	9.28	8.50	2.92	.....	2.92	3.00	1.00	1.45	a.19	1.64	1.65	25.63	26.35
8.28	8.00	1.54	9.82	8.50	2.81	.....	2.81	3.00	1.40	1.86	a.24	2.10	2.06	27.91	26.35
8.90	9.00	1.85	10.75	9.50	2.55	.....	*2.55	3.00	.66	.87	a.13	1.00	.82	23.07	{ 25.00 24.35 23.00
10.01	9.00	.71	10.72	10.00	2.13	.81	2.94	3.00	.85	.98	a.08	1.06	.83	24.74	{ 22.00 24.50	
8.45	8.00	1.16	9.61	9.00	1.80	.41	2.21	2.00	1.08	1.44	a.25	1.69	1.65	24.90	24.00	
9.03	8.00	.88	9.91	9.00	.99	.....	.99	1.00	.59	.80	b.15	.95	.83	19.33	{ 22.00 18.50 20.00 19.00 23.00
8.66	8.00	1.03	9.69	9.00	1.47	.60	2.07	2.00	1.16	1.56	a.19	1.75	1.65	25.00	.....
10.63	8.00	.87	11.50	10.00	.95	.....	.95	1.00	.62	1.05	a.25	*1.80	1.64	23.27	29.00
10.73	7.00	.87	11.65	9.00	3.55	.....	2.55	2.00	1.28	1.85	c.26	1.61	1.21	27.08	24.00
8.09	8.00	1.23	9.47	9.00	1.43	.....	1.43	1.00	.68	.83	b.16	.98	.83	19.99	{ 20.00 17.00
†9.43	10.00	.77	*10.20	11.00	.97	.....	.97	1.00	.04	.21	c.28	.49	.41	15.04	{ 18.00
10.96	11.00	1.50	12.46	12.00	.62	.....	*.63	1.00	.23	.50	c.44	.94	.82	20.53	{ 24.00 22.00
†8.40	9.00	3.04	*11.44	12.00	3.38	.....	*3.38	5.00	1.39	2.04	b.45	*2.49	3.20	21.76	34.00

a b c characters indicating the proportion of insoluble nitrogen that is inactive: a=two-fifths or less; b=two-fifths to three-fifths; c=three-fifths or more.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
EUREKA CHEMICAL CO., BALTIMORE, MD.			
92	{Eureka Complete Compound,	S. P. Miller, Littlestown,	4.28
46		Geo. W. Zimmerman, Mifflinburg, R. D.	
98		N. E. Gobrecht & Bro., Hanover, ..	
72		D. B. Dumm, Thompsonstown,	
655	{Eureka Farmers' Favorite,	C. S. Funk, New Stanton,	3.63
625		Peter Boyer, Fleetwood, R. No. 1, ..	
91		S. P. Miller, Littlestown,	
EUREKA FERTILIZER CO. OF LANCASTER, PA.			
97	Grain and Grass,	M. E. Gobrecht & Bro., Hanover, ..	3.57
FARMERS' FERTILIZER WORKS, ELIZABETHTOWN, PA.			
35	{Farmers' Club Brand,	J. D. Greybill & Son, Belleville, ..	7.85
342		B. F. Hortling, Newport,	
248		H. F. Hortling, Newport,	
94		J. D. Greybill & Son, Belleville, ..	
569	{Grain and Grass Special,	John Sheets, Elizabethtville,	3.54
779		B. F. Hortling, Newport,	
563		Ell Ginerich, York, R. D.,	
244		B. F. Hortling, Newport,	
567	{Farmers' Golden Sheaf,	John Sheets, Elizabethtville,	7.51
562		Ell Ginerich, York, R. D.,	
568		John Sheets, Elizabethtville,	
843		H. H. Martin, Manheim,	
566	{Farmers' I. X. L.,	John Sheets, Elizabethtville,	9.02
842		H. H. Martin, Manheim,	
W. S. FARMER & CO., BALTIMORE, MD.			
99	Harvest Queen,	M. J. Sheffer, Hanover,	12.02
MAHLON FRETZ, SELLERSVILLE, PA.			
170	Fretz's Standard Phosphate,	Mahlon Rickert, Sellersville,	6.58
JOS R. GAWTHROP, KENNETT SQUARE, PA.			
158	Champion Fertilizer for Wheat and Grass, ..	Jos. K. Gauthrop, Kennett Square, ..	6.96
GRIFFITH & BOYD CO'S, BALTIMORE, MD.			
810	Ammoniated Bone Phosphate,	Harvey Webber, Hamburg, R. No. 1, ..	9.15
563	Animal Bone with Potash,	J. J. Coleman, Gratz,	10.40
145	{Fish Bone and Potash,	S. K. Chambers & Bro., Elkview, ..	3.16
134		Geo. C. Linebaugh, Dover, R. No. 4, ..	
306		E. A. Slagle, Paxinos,	
561		J. L. Meyers, Loganville,	
133	{Harvest Queen Phosphate,	Geo. C. Linebaugh, Dover, R. No. 4, ..	9.25
27		Frank Hayes, Reedsville,	
146		S. K. Chambers & Bro., Elkview, ..	
802		A. B. Harnish, Mechanicsburg,	
394	{Peerless Fertilizer,	L. A. Meyers, Hooversville, R. D. No. 1, ..	10.27
S. M. HESS & BROS., INC., PHILA., PA.			
25	{Ammoniated Super Phosphate,	J. D. Hostetler, Lewistown, R. D., ..	3.00
4		Geo. Emerick, Centre Hall,	
94		H. H. Basehore, Littlestown,	
250		S. D. Snyder, Meyerstown, R. D. No. 5, ..	
138	{Fish and Potash Manure,	Ledy Allen, Wismer,	3.32
437		W. J. Newhart, Gilberts,	
719		Robt. Nagley, Milroy,	
92		H. H. Basehore, Littlestown,	
24	{Wheat and Grass Manure,	J. D. Hostetler, Lewistown, R. D., ..	3.43
187		Ledy Allen, Wismer,	
HUBBARD FERTILIZER CO. THE, BALTIMORE, MD.			
668	Hubbard's Special Compound,	Chas. Schumacher, Friedens,	3.00

†Composite sample.

*Constituent falls below guaranty.

LIZERS—Continued

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.					Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs. at point of selection.
Available.		Insoluble.	Total.		Present as Muriate.	Present as Sulphate.	Total.		Water Soluble.	Available.	Inactive Insoluble.	Total.				
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.			
7.76	7.00	.42	8.18	7.50	.92	...	.92	1.00	.45	.67	c.27	.84	.82	17.33	{ 18.50 18.50
8.63	8.00	.70	9.33	8.50	.97	...	.97	1.00	.67	.96	b.22	*1.08	1.50	19.49	{ 17.00 19.25 25.00
9.08	8.00	.62	9.65	8.50	.63	...	.33	.50	.65	.78	b.19	.97	.82	18.55	{ 19.55 20.00
17.62	8.00	1.06	8.68	8.50	.67	.79	*1.46	2.00	.43	.62	c.32	.94	.82	19.28		
8.98	8.00	.26	9.15	9.00	.40	.50	*.90	2.00	.79	.....	.....	.90	.92	18.60	19.00
8.59	8.00	.51	9.10	.....	2.00	.....	2.00	2.00	.32	.60	c.51	1.01	.41	21.02	{ 21.75 18.75 23.75 21.40
8.49	8.00	3.8	8.87	.....	2.73	.....	*2.73	3.00	.39	.58	c.48	1.06	.82	22.61	{ 17.75 19.70
10.37	10.00	1.46	11.53	.....	.67	.....	.67	.....	.59	.78	c.32	1.10	1.02	20.80	
*9.06	10.00	2.97	12.03	.....	.67	.....	.67	.....	1.04	1.38	b.26	1.54	1.05	22.21	{ 22.21
9.14	8.00	1.05	10.19	.....	2.19	.....	2.19	2.00	.56	.89	c.68	1.56	1.65	24.69	{ 24.60 20.00
7.85	7.00	.54	8.39	.....	1.24	.....	1.24	1.00	.31	.53	c.51	1.04	.82	19.08	
9.20	9.00	1.73	10.93	10.00	3.04	.....	3.04	3.00	.91	1.08	b.16	1.24	1.08	25.45	23.00
7.05	7.00	.53	7.58	8.75	1.14	.....	1.14	1.00	.76	.95	b.17	1.12	.82	18.54	20.00
7.72	4.00	3.17	10.89	8.00	.40	.16	.56	.50	.89	1.54	b.62	2.16	1.50	23.85	27.00	
8.92	8.00	1.02	9.94	9.00	1.51	.....	1.51	1.25	.46	.84	b.85	*1.22	1.65	21.46	{ 25.00 20.00 21.00
10.04	9.00	.96	11.00	10.00	1.21	.....	*1.21	2.00	.66	1.08	b.57	1.60	1.65	23.65	
8.78	7.00	.79	9.57	8.00	1.74	.....	*1.74	2.00	.47	.78	c.50	*1.23	1.50	21.98	{ 17.00 17.00 21.00
9.19	9.00	1.56	10.75	10.00	1.83	.....	1.83	2.00	.38	.51	c.24	.75	.85	20.51	
8.81	8.00	1.66	10.47	9.00	1.06	.....	1.06	1.00	.39	.86	c.17	.53	.41	15.26	{ 17.00 17.00 21.00
9.11	8.00	1.59	10.70	9.00	1.54	.....	*1.54	2.00	.33	.43	b.29	.77	.85	19.95	
9.27	8.00	1.40	10.67	9.00	1.67	.....	*1.67	2.00	.24	.34	c.21	.55	.41	16.72	.....
8.16	8.00	1.59	9.75	9.00	2.14	....	2.14	2.00	1.17	1.44	b.24	1.68	1.65	24.18	{ 24.00 22.25
7.98	8.00	1.23	9.21	9.00	2.52	.....	2.52	3.00	.86	1.26	b.40	1.66	1.65	26.86	{ 26.00 19.50 21.00
6.52	6.00	.91	7.43	7.00	2.63	....	*2.63	3.00	.54	.71	b.19	.90	.82	20.24	
8.28	8.00	1.29	9.57	9.00	1.96	.....	1.96	2.00	.72	.84	b.18	1.03	.83	21.02	{ 19.50 21.00
12.95	12.00	.96	13.96	13.00	.62	.....	.62	.....	.37	.43	c.30	.78	.61	18.08	13.00

a b c characters indicating the proportion of insoluble nitrogen that is inactive: a—two-fifths or less; b—two-fifths to three-fifths; c—three-fifths or more.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
	INTERNATIONAL AGRICULTURAL CORP., BUFFALO FERT. WORKS, BUFFALO, N. Y.		
477	{†Buffalo Farmers' Choice,	Wm. H. McCum, Clymer, R. D., ..	3.43
516	{	Asa McDonald, Greenville,	
397	Buffalo One Eight Two,	Edward Frazier, Shanksville,	6.26
527	JARECKI CHEMICAL CO., SANDUSKY, O. Raw Bone and Phosphate Mixture,	Frank Metz, Freedom,	5.81
	KEYSTONE BONE FERTILIZER CO., PHILA- DELPHIA, PA.		
320	1915 Keystone Economy Potash Compound,	M. K. Keith & Son, Wernersville, ..	8.07
504	{	Chas. Ebner, Easton, R. D. No. 3, ..	
308	{1915 Keystone Excelsior Wheat Grower,	E. A. Slagle, Paxinos,	8.95
578	{	A. B. Bomgardner, Paimyra,	
495	{1915 Keystone Grain and Grass Manure,	Eugene Green, Kunkletown,	7.60
744	{	Chas. Schoffstall, Valley View,	
321	1915 Keystone Royal Corn and Potato Manure,	M. K. Keith & Son, Wernersville, ..	9.49
	LANCASTER BONE FERTILIZER CO., LAN- CASTER, PA.		
17	Complete Ammoniated Bone Manure,	J. W. Garman, Rockfield,	9.85
64	{†Lancaster Favorite,	H. W. Milliken, Academia,	8.90
453	{	Ira Bechtel, Roaring Spring,	
340	{	O. H. Gibbons, Saulsburg,	
288	{†Corn Grass and Wheat Special,	Harry Hufnagle, New Oxford,	6.13
459	{	Ira Bechtel, Roaring Springs,	
332	{†Keystone Standard,	John A. Cooper, Washingtonville, ..	8.26
460	{	Ira Bechtel, Roaring Springs,	
18	Scientific Animal Bone Compound,	J. W. Garman, Rockfield,	11.12
	LANCASTER CHEMICAL CO., LANCASTER, PA.		
554	{†General Crop Special No. 15,	H. W. Burg, East Prospect,	
172	{	Abraham Hendricks, Perkasio, R. ..	10.07
740	{	No. 4,	
613	Hard Times No. 6,	Elias Morgan, Pine Grove,	9.05
788	{	New Providence Coal Co., New Pro- vidence,	
555	{†Success Brand, No. 13,	Elias Morgan, Pine Grove,	
800	{	H. W. Burg, East Prospect,	7.31
171	No. 3 Dissolved Animal Bone and Potash,	D. J. Beltzel, Mechanicsburg,	7.40
739	No. 4 Rising Sun Animal Bone,	Abraham Hendricks, Perkasio, R. ..	
352	Three, Ten, Two,	No. 4,	8.93
		Elias Morgan, Pine Grove,	7.75
		W. E. Bongo, Rochester, R. No. 1, ..	
235	LEBANON FERTILIZER WORKS, LEB- ANON, PA. Levan's Wheat and Grass Fertilizer,	A. J. Fidler, Sec., Bock Grange No. 1258,	6.16
	LISTER AGRICULTURAL CHEMICAL WKS., NEWARK, N. J.		
166	{†Lister's Ammoniated Dissolved Super- Phosphate,	W. E. Ervin, Somerton,	9.85
317	{	Zehner Bros., Bloomsburg,	
	LISTER AGR. CHEM. WKS., NEWARK, N. J.		
23	{†Lister's Golden Sheaf,	M. P. Herman, Sellingsgrove,	8.46
10	{	C. H. Unger, Spring Mills, R. D., ..	
370	{	Allison & Fogelsonger, Shippensburg, Allison & Fogelsonger, Shippensburg, J. N. Herst, New Oxford,	10.30
271	{†Lister's Harvest Queen Phosphate,	D. W. Bortz, Greensburg,	8.61
110	{	Jacob Krug, Hastings,	
650	{	Wm. H. Fritz, Berwyn,	
467	{†Lister's Special for Wheat and Rye,	W. H. Schriver, Dillsburg,	10.13
428	{	Jacob Krug, Hastings,	
79	{†Lister's Special Wheat Fert.,	A. M. Grove & Co., Muddy Creek Forks,	8.92
466	{	C. H. Unger, Spring Mills,	9.66
547	{	William Kinney, Jerseytown,	
9	{†Lister's Squirrel Brand Fert.,	W. H. Schriver, Dillsburg,	
692	{	Wm. H. Fritz, Berwyn,	
80	{†Lister's Standard Pure Super Phosphate of Lime,	N. I. Norton, New Albany,	11.39
427	{		
634	Lister's Wheat & Rye Fert.,		

†Composite sample.

*Constituent falls below guaranty.

FIZERS—Continued

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs. at point of selection.
Available.			Total.		Present as Muriate.	Present as Sulphate.	Total.		Water Soluble.	Available.	Inactive Insoluble.	Total.			
Found.	Guaranteed.	Insoluble.	Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
10.66	10.00	1.34	12.00	11.00	2.15	2.15	2.00	.38	.68	b.26	.89	.80	23.13	{ 24.00 25.00 26.50
*7.79	8.00	1.67	9.46	9.00	1.98	.11	2.04	2.00	.51	.81	a.19	1.00	.80	20.98	
9.62	8.00	7.09	16.61	16.00	.99	.....	.99	1.00	.63	1.29	a.36	1.65	1.66	25.98
6.56	5.00	1.34	7.90	6.00	1.78	1.78	1.00	.67	.79	b.16	.96	.82	18.94	{ 17.00 21.50 20.00
7.77	7.00	1.58	9.35	8.00	3.11	.....	3.11	3.00	.74	.86	b.19	1.06	.82	23.26
8.23	7.00	1.61	9.84	8.00	1.44	.....	1.44	1.00	.70	.82	b.18	1.00	.82	20.13
*7.56	8.00	1.79	*9.36	10.00	3.18	3.18	3.00	1.22	1.68	b.36	2.04	2.06	27.99	{ 18.00 18.50 27.50
8.44	8.00	1.46	9.90	9.00	2.40	.....	2.40	2.00	.56	.71	c.30	1.01	.82	22.16
*9.51	10.00	.94	*10.48	11.00	1.27	.....	1.27	1.00	.89	1.18	b.28	1.46	1.66	22.62
*8.66	9.00	1.57	10.23	10.00	.4848	.50	.67	.86	c.33	1.18	1.23	19.47	{ 21.00 17.50
10.33	10.00	.90	11.13	11.00	1.19	.....	1.19	1.00	.26	.....	.....	.44	.23	15.92
*8.17	9.00	1.56	*9.76	10.00	2.17	.....	2.17	2.00	.88	1.04	c.22	1.32	1.28	22.82
9.23	8.00	.57	9.80	9.00	.73	.57	*1.30	3.00	.99	1.18	b.20	*1.38	1.66	22.17	{ 23.00 17.00
11.24	10.00	1.01	12.25	11.00	.40	.58	.98	1.00	.21	.41	b.21	.62	.44	16.98	
8.87	8.00	1.06	9.93	9.00	1.07	.46	*1.53	3.00	.46	.64	b.19	.82	.83	20.07	
*9.26	10.00	.93	*10.18	11.00	1.08	*1.08	3.00	1.69	1.83	1.66	23.86	{ 24.00 27.00
*7.70	10.00	.61	*8.31	11.00	.67	1.19	1.86	2.00	1.24	2.09	a.30	2.39	2.47	26.64	
10.22	10.00	.71	10.96	11.00	.40	1.05	*1.45	2.00	1.06	1.18	a.08	*1.26	2.47	22.56	
9.12	8.00	1.02	10.14	9.00	3.07	*3.07	4.00	.58	.63	c.19	.82	.82	22.99	{ 28.00 27.00 26.00
8.41	8.00	1.73	10.19	9.00	1.38	.....	1.38	1.50	.84	1.30	b.56	*1.86	2.06	24.12
8.41	8.00	.96	9.37	9.00	2.06	.....	2.06	2.00	.82	.....	.....	.53	.41	19.11
9.33	9.00	1.91	11.29	10.00	2.18	2.18	2.00	.69	.92	b.33	1.25	1.23	23.96	{ 19.50 19.00 23.50
8.31	8.00	1.51	9.82	9.00	2.18	.....	2.18	2.00	1.14	1.42	b.23	1.65	1.66	24.61
8.03	8.00	2.04	10.07	9.00	3.00	.....	3.00	3.00	1.02	1.27	b.36	1.68	1.66	26.28
*7.80	8.00	1.92	9.72	9.00	2.06	2.06	2.00	.53	.69	b.23	.92	.82	20.60	{ 27.50 20.50 27.00
9.01	9.00	1.76	10.77	10.00	2.68	.....	2.68	2.00	1.51	1.94	b.48	2.42	2.47	29.79
8.00	8.00	1.29	9.29	9.00	2.28	.....	2.28	2.00	.84	1.37	a.34	1.71	1.66	24.72

a b c characters indicating the proportion of insoluble nitrogen that is inactive: a—two-fifths or less; b—two-fifths to three-fifths; c—three-fifths or more.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
	FREDERICK LUDLAM CO., BALTIMORE, MD.		
782	Ludlam's Cecrops Fert., A. B. F. Brand...	Lewis Long, Ellittsburg,	9.98
109	Ludlam's Cecrops Fert. No. 2, Grain & Grass.	W. D. Myers, East Berlin,	9.61
	MAPES FORMULA & PERUVIAN GUANO CO., NEW YORK.		
414	Mapes Cereal Brand,	Henry W. Satterthwait, Woodbourne,	7.97
	MARTIN FERTILIZER CO., PHILA., PA.		
54	Martin's Ammoniated Phosphate,	Buffalo Valley Farmers & Consumers Asso., Lewisburg,	12.46
77	†Martin's Corn & Cereal Special,	Diehl, Omwake & Diehl, Greencastle,	9.75
58		Buffalo Valley Farmers & Consumers Asso., Lewisburg,	
417	†Martin's Dissolved Organic Compound, ...	N. B. Keim & Sons, Langhorn, ..	9.39
234		Jno. K. Miller, Summit Station, ...	
13	Martin's Pure Animal Bone & Potash,	J. O. Bowersox, Middleburg,	4.33
416		N. B. Keim & Sons, Langhorn, ..	
62	Martin's Special Crop Grower,	Buffalo Valley Farmers & Consumers Asso., Lewisburg,	11.40
51		Buffalo Valley Farmers & Consumers Asso., Lewisburg,	
832	Martin's Sure Grower,	L. A. Geiger, Joanna,	11.63
	MILLER FERTILIZER CO., THE, BALTIMORE, MD.		
338	†Ammoniated,	W. H. Muth & Co., Little,	6.00
456		M. T. Harkins, Hickory Hill,	
536	†Harvest Queen,	J. P. Schuchart, New Freedom,	7.37
308		J. A. Gass, Sunbury,	
259	†Hustler Phosphate,	John Shiffer, Derry Church, R. No. 2,	6.71
761		C. R. Bucher, Myerstown,	
269	†M. B. S.,	John Shiffer, Derry Church, R. No. 2,	7.04
21		J. W. Teats, Mt. Pleasant Mills, ...	
549	†Miller's No. 1 Special,	F. M. Shenberger, Red Lion, R. No. 1,	6.00
302		J. A. Gass, Sunbury,	
20	†Miller's No. 2 Special,	J. W. Teats, Mt. Pleasant Mills, ...	5.65
537		J. P. Schuchart, New Freedom,	
536	†Standard Phosphate,	J. P. Schuchart, New Freedom,	3.97
19		J. W. Teats, Mt. Pleasant Mills, ...	
762	W. G. Phosphate,	C. R. Bucher, Myerstown, No. 4, ...	3.71
301		J. A. Gass, Sunbury,	
136	NASSAU FERTILIZER CO., NEW YORK CITY.	Geo. C. Linebaugh, Dover No. 4, ...	9.50
839		W. H. Muth & Co., Little,	
126	W. G. Phosphate,	Geo. C. Linebaugh, Dover No. 4, ...	9.57
	NASSAU FERTILIZER CO., NEW YORK CITY.		
563	Big Yield,	Philip Miller, Nescopeck,	9.41
569	Plow Brand,	Philip Miller, Nescopeck,	12.53
804	Special Mixture,	W. H. Mumma, Mechanicsburg,	9.37
586	†Wheat & Grass Grower,	Philip Miller, Nescopeck,	9.37
624		Daniel A. Rosenberger, Oley,	
	G. OBER & SONS CO., BALTIMORE, MD.		
399	Ober's Farmers Mixture,	Merle Hay, Berlin R. D. No. 1,	9.53
784	Ober's Independent Ammoniated Super Phosphate,	J. M. Sarver, Millerstown,	9.10
128	†Ober's Red Arrow Guano,	D. Blocher & Co., Gettysburg,	9.36
400		Merle Hay, Berlin, R. No. 1,	
721	Ober's Sea Island Fish Guano,	Wagner Geisse, Bellefonte,	9.97

†Composite sample.

*Constituent falls below guaranty.

FIZERS—Continued

Phosphoric Acid in 100 Pounds					Potash in 100 Pounds.				Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs. at point of selection.
Available.		Insoluble.	Total.		Present as Muriate.	Present as Sulphate.	Total.		Water Soluble.	Available.	Inactive Insoluble.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
8.25 7.14	9.00 7.00	1.73 1.34	9.98 8.38	9.00 8.00	1.83 1.16	..... .....	1.83 1.16	2.00 1.00	1.21 .90	1.53 .78	a.21 b.19	1.74 .97	1.65 .82	24.52 12.12	23.50 15.35
7.05	8.00	1.61	9.66	8.00	.89	1.61	*2.41	3.00	.80	1.23	b.57	1.80	1.65	25.10	26.00
*9.55	10.00	.50	10.14	.....	.40	.30	.70	.....	2.83	3.02	c.36	3.33	1.65	30.29	.....
9.58	8.00	1.54	11.12	.....	1.48	.....	*1.48	2.00	.62	1.01	c.66	1.67	1.65	24.29	24.00
8.99	9.00	1.34	10.23	.....	1.82	.....	1.82	2.00	.66	.71	c.30	1.10	1.03	21.33	24.25
9.50	.....	5.37	*14.96	16.00	1.43	.....	*1.45	2.50	.71	1.24	a.21	*1.45	1.65	25.28	22.00
9.90	10.00	.88	10.78	.....	1.28	.....	1.28	.50	.57	.74	c.33	1.12	1.03	21.32	21.00
8.19	8.00	1.21	9.40	.....	1.06	.....	1.06	1.00	.66	.71	.37	1.06	.82	18.52	18.00
8.21	9.00	.83	9.84	9.50	.97	.....	.97	1.00	.97	1.13	b.31	1.40	1.44	20.5	.....
9.27	9.00	.64	9.61	9.50	1.12	.....	1.12	.75	.70	.80	b.20	1.09	1.03	20.30	21.00
8.55	8.00	.57	9.12	8.50	.74	.....	.74	.50	.30	.75	b.21	.96	.82	18.20	19.00
8.08	7.00	.57	8.60	7.50	1.33	.....	1.33	2.00	.66	.70	c.23	.98	.82	20.25	17.25
9.87	10.00	1.04	10.91	10.50	.63	.....	.63	.....	1.12	1.25	b.34	1.60	1.65	22.96	23.00
9.41	9.00	.41	9.82	9.50	.67	.16	.83	.....	.71	.85	c.25	1.10	1.09	19.84	22.00
8.47	8.00	.46	8.92	8.50	.80	1.13	1.93	2.00	1.74	1.98	b.35	2.33	2.47	27.20	26.00
6.87	7.00	.42	*7.28	7.50	.48	.....	.48	.50	.22	.37	b.19	.66	.41	14.40	16.50
*8.50 7.97	9.00 8.00	2.04 1.37	10.63 9.04	10.00 9.00	2.16 1.06	..... .....	2.16 2.06	3.00 2.00	.91 1.05	1.38 1.45	b.20 b.33	1.62 1.78	1.65 1.65	26.85 24.33	26.75 25.00
10.18 8.31	10.00 8.00	1.54 1.21	11.72 9.32	11.00 9.00	2.63 2.10	..... .....	*2.63 2.10	3.00 2.00	.57 .66	.70 .79	b.16 b.18	.66 .97	.82 .82	23.56 21.07	..... 22.00
9.52 9.05	9.00 8.00	.91 1.05	10.47 10.10	10.00 9.00	2.54 1.32	..... .....	2.54 1.22	2.00 1.00	.63 .97	.92 .70	b.20 b.35	1.12 1.05	.82 .82	23.65 20.20	22.00
9.36	9.00	.96	10.22	10.00	1.35	.....	1.35	2.00	.62	.86	a.15	1.01	.82	24.07	23.00
8.05	8.00	1.08	9.13	9.00	2.10	.....	2.10	20.0	1.06	1.40	a.2	1.77	1.65	24.44	23.75

a, b, c: Letters indicating the proportion of insoluble nitrogen that is inactive: a—2/5 or less b—2/5 to 3/5; c—3/5 or more.

Sample number	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
PATAPSCO GUANO CO., BALT., MD.			
181	†Patapasco B. B. & P. Brand,	I. E. Noble, Pleasant Valley,	9.70
120		E. C. Thomas, Gettysburg,	
374	†Patapasco General Crop Produce,	Chas. Shimmel, Ackermanville, ..	9.07
180		I. E. Noble, Pleasant Valley,	
278	Patapasco Golden Crop Fertilizer,	John Fallor, Newburg,	9.32
630		Summit Lumber Co., Clarks Summit, ..	
182	†Patapasco Special Grain & Grass Producer, ..	I. E. Noble, Pleasant Valley,	9.84
60		G. R. Schell, Vicksburg,	
279		John Fallor, Newburg,	
PIEDMONT MT. AIRY GUANO CO., BALTIMORE, MD.			
796	Insula Guano for All Crops,	A. H. Ush, Millerstown,	7.82
727	Levering's Excelsior,	Jno. G. Dubbs, Bellefonte,	6.08
585	†Levering's Harvest Queen,	T. W. Rumbel, Ringtown,	7.18
123		H. D. & J. F. Bream, Gettysburg, ..	
728	Piedmont Eagle Brand,	Jno. G. Dubbs, Bellefonte,	8.18
127		H. D. & J. F. Bream, Gettysburg, ..	
PITTSBURG PROVISION & PACKING CO., PITTSBURGH, PA.			
649	Keystone Fertilizer,	P. H. Saxman, Latrobe,	7.99
POLLOCK FERTILIZER CO., THE, BY AMER. AGRI. CHEM., BALTIMORE, MD.			
548	The Pollock's Fertilizer Co., Ammoniated Super Phosphate,	F. M. Shenberger, Red Lion, B. No. 1,	8.63
39		C. S. Garbrick, Mingoville,	
685	†The Pollocks Fert. Co., Special Invigorator,	Wilson Dibert, Bedford,	9.40
95		J. H. Kelley, Littlestown,	
61	The Pollocks Fert. Co., Special Wheat and Corn Fertilizer,	H. M. Owen & Co., Lewistown, ..	10.54
284		J. D. Garman, Mongal,	
140		John Gingerich, Seven Valley, R. D. ..	
RASIN MONUMENTAL CO., BALTIMORE, MD.			
160	Rasin's Best Wheat & Grass Producer, ...	W. H. Walker & Co., Kennett Square,	9.88
47	Rasin's Emergency Royal Fish Bone & Potash,	S. B. Miller, Mifflinburg,	10.51
561	Rasin's Empire Guano Special,	Emanuel Boyer, Elizabethtville,	8.97
836	Rasin's Quality Compound,	L. A. Geiger, Joanna,	11.06
139	†Rasin's Royal Fish Bone & Potash,	H. M. Sunday, Dover No. 2,	11.78
68		W. W. Bock, Port Royal,	
147	Rasin's Royal Manure,	E. H. Keen & Co., Parkersburg, ...	10.09
321		H. D. Miller, Mifflinville,	
700	Rasin's Special Fish & Bone Guano,	H. B. Low & Son, Orangeville, ...	8.18
701	†Rasin's Special Fish & Potash Mixture, ...	H. B. Low & Son, Orangeville, ...	9.70
835		L. A. Geiger, Joanna,	
179	†Rasin's United Grain Grower,	Henry K. Mohr, Quakertown,	8.41
7		Bradford & Son, Center Hall,	
408		C. G. Sechler, Somerset R. D. No. 1, ..	
ROBT. A. REICHARD, ALLENTOWN, PA.			
208	Golden Harvest Phosphate,	No agent, Fogelsville,	5.25
363	Improved Top Dresser,	E. J. Gerbach, Bethlehem,	6.53
361	Surpass Phosphate,	E. J. Gerbach, Bethlehem,	5.10
F. S. ROYSTER GUANO CO., BALTIMORE, MD.			
660	†Royster's Farmers Delight,	C. C. Davis, Greensboro,	8.57
43		Jno. H. Strickler, Mifflinburg,	
766	†Royster's Seeding Down Special Fert., ...	Chas. E. Ziegler, Dunsmuir,	8.22
181		G. B. Murphy, Red Lion,	
26	†Royster's Wheat, Oats & Barley Fertilizer, ..	Wm. W. Atkinson, McVeytown,	8.97
192		John N. Stein, Compassville,	
44		Jno. H. Strickler, Mifflinburg,	
40		J. S. Waite & Co., Bellefonte,	
132		G. B. Murphy, Red Lion, No. 1, ...	

†Composite sample.

*Constituent falls below guaranty.

LIZERS—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs. at point of selection.
Available.		Insoluble.	Total.		Present as Muriate.	Present as Sulphate.	Total.		Water Soluble.	Available.	Inactive Insoluble.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
8.28	8.00	.93	9.21	9.00	1.92	.....	1.92	2.00	.37	.46	b.11	.57	.41	19.69	17.75
7.21	7.00	1.15	8.36	8.00	.92	.....	.92	1.00	.51	.65	b.13	.83	.83	17.15	19.00
9.50	9.00	1.21	10.71	10.00	2.76	.....	*2.76	3.00	1.15	1.48	b.30	1.78	1.65	27.99	19.60
7.77	4.00	1.40	9.17	5.00	2.83	.....	2.83	3.00	.73	.86	b.16	1.02	.82	22.19	17.40
9.90	7.00	.68	10.58	.....	2.02	.....	2.02	2.00	.28	.36	c.19	.55	.41	17.70	25.00
9.34	8.00	.76	10.10	.....	1.02	.....	1.02	1.00	.44	.57	c.23	.85	.82	19.09	21.50
9.45	8.00	.61	10.06	.....	1.75	.....	*1.75	2.00	.48	.60	c.23	.83	.82	20.97	22.00
10.53	10.00	.96	11.46	.....	.53	.22	*.75	1.00	.69	1.19	a.33	1.52	1.65	22.77	23.00
9.21	9.00	1.91	11.12	11.00	1.50	.....	1.50	1.50	.23	1.04	b.31	1.85	1.49	25.21	24.50
7.97	8.00	1.53	9.50	9.00	1.86	.....	1.86	2.00	1.18	1.36	b.23	1.59	1.65	23.97	25.00
8.26	8.00	1.17	9.43	9.00	2.90	.....	2.90	3.00	.65	.77	b.18	.95	.83	22.65	22.00
8.09	8.00	1.58	9.67	9.00	2.02	.....	2.02	2.00	.79	.91	b.14	1.05	.82	21.31	25.50
8.39	8.00	1.07	9.46	9.00	3.36	.....	3.36	3.00	1.13	1.35	c.20	1.45	1.23	25.93	19.77
8.80	8.50	2.89	11.73	9.50	1.09	.....	1.09	1.00	.85	1.24	b.36	1.80	1.65	23.35	.....
8.30	8.00	.75	9.05	9.00	2.06	.....	*2.06	3.00	1.27	1.43	a.09	*1.53	2.47	23.25	22.90
7.89	7.00	1.02	8.91	8.00	2.85	.....	2.85	3.00	.57	.68	b.17	.86	.82	21.69	22.00
8.59	8.00	1.85	10.44	9.00	3.28	.....	3.28	3.00	.79	1.17	b.46	1.63	1.65	27.19	24.50
8.95	8.00	1.91	10.86	9.00	1.04	.....	1.04	1.00	.27	.....	.....	.45	.41	14.96	25.00
11.52	11.00	2.39	14.21	12.00	.68	.....	.68	.....	.71	1.04	b.30	*1.34	1.65	23.76	20.00
6.63	6.00	1.33	7.95	7.00	3.32	.....	3.32	3.00	.86	1.39	a.33	1.72	1.65	25.47	23.00
8.83	8.00	1.98	10.81	9.00	1.98	.....	1.98	2.00	.49	.68	b.22	.85	.82	21.39	22.50
7.87	8.00	1.63	*9.50	10.00	4.53	30	4.83	5.00	.57	1.35	a.41	1.66	1.64	29.78	20.76
6.40	6.00	.46	*6.86	7.50	4.22	.....	4.22	4.00	5.39	6.27	a.37	6.64	6.58	49.27	45.00
8.31	8.00	.26	*8.57	10.00	1.96	.....	1.96	2.00	.53	1.12	b.48	1.50	1.64	28.27	26.00
8.11	8.00	.91	9.10	8.50	1.94	.....	1.94	2.00	.19	.38	b.17	.55	.41	16.53	26.00
9.31	9.00	1.06	10.45	9.50	2.98	.....	2.98	3.00	.63	.87	a.11	.98	.82	24.05	18.50
8.19	8.00	.96	9.17	8.50	2.14	.....	2.14	2.00	.54	.82	a.18	1.00	.82	21.19	25.50
															23.00
															20.50

a, b, c: Letters indicating the proportion of insoluble nitrogen that is inactive: a—2/5 or less; b—3/5 to 5/6; c—5/6 or more.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
SCOTT FERTILIZER CO., THE. ELKTON, MD.			
367	†Scott's Grain Special,	William Beck, Easton, R. D. No. 4,	3.51
258	†Scott's Standard Phosphate,	Elias S. Brubacher, Richland,	
614	†Scott's Sure Crop Grower For Wheat	M. R. Boyer, Ephrata, R. D. No. 4,	7.69
498	Grass,	David Green, Little Gap,	
615	†Scott's Sure Crop Grower For Wheat	M. R. Boyer, Ephrata, R. D. No. 4,	8.75
450	Grass,	Mackay & Yerkes, Oxford,	
492	Grass,	N. A. Borillinger, Palmerton, No. 1,	
SMITH'S AGRICULTURAL CHEMICAL CO., COLUMBUS, O.			
530	Smith's Corn, Oats and Wheat Fert.,	W. F. Beck, W. F. Beck's Farm, Lancaster Co., Pa.	5.53
581	Smith's Crop Producer,	W. F. Beck, W. F. Beck's Farm, Lancaster Co., Pa.	8.39
FOR SOUTHERN FERT. CO., YORK, PA., BY AM. AGR. CHEM. CO.			
143	Southern Fert. Co.'s Farmer's Choice Brand,	Bert Hoff, Spring Grove,	10.94
141	†Southern Fert. Co.'s General Crop Grower,	Bert Hoff, Spring Grove,	10.08
385	Southern Fert. Co.'s Special Potato Grower Revised,	J. G. Rishel, Jerseytown,	
691	Revised,	J. G. Rishel, Jerseytown,	8.23
STANDARD GUANO CO., BALTIMORE, MD.			
2233	Standard Fish Bone & Potash,	H. H. Loose, Manges Mills,	7.00
2374	†Standard Jewel Mixture,	L. Cooper Ramsay, Delta,	
3263	Swift & Co., BALTIMORE, MD.	C. L. Shipman, Hughesville,	
442	†Swift's Pure Grain & Grass Grower,	J. C. Emery & Co., Nottingham, ..	7.28
423	†Swift's Pure Grain Fertilizer,	W. J. Pratt & Sons, West Chester, R. D.	
642	†Swift's Pure Grain Fertilizer,	L. M. Smith, Tioga,	8.23
309	†Swift's Pure Grain Fertilizer,	Reed and Erdman, Paxinos,	
70	†Swift's Pure Grain Fertilizer,	Jalloway and Meek, Allenwood,	7.11
788	†Swift's Pure Grain Fertilizer,	Kimp and Moore, Millertown,	
811	†Swift's Pure Grain Fertilizer,	Reed and Erdman, Paxinos,	
TAYLOR PROVISION CO., TRENTON, N. J.			
415	Standard Grain Grower,	Henry Palmer, Langhorn,	8.24
I. P. THOMAS & SONS CO., PHILADELPHIA, PA.			
422	Champion Fertilizer,	John B. Detwiler, Dublin,	11.25
173	†Farmer's Choice Phosphate,	I. S. Snyder, Sellersville,	
65	†Farmer's Choice Phosphate,	L. S. Knezer, Milfintown,	10.14
518	†Farmer's Choice Phosphate,	Wm. J. Moyer, Greenville,	
421	†Superior Super Phosphate,	John B. Detwiler, Dublin,	8.71
271	†Superior Super Phosphate,	George Hayden, Nazareth, R. D. No. 4,	
696	†Tip Top Guano,	C. R. Henrie & Son, Millville,	10.25
66	†Tip Top Guano,	L. S. Knezer, J. A. Martin, Milfintown, R. D.	
708	†Tip Top Guano,	F. P. Davis, Bloomsburg,	
TRENTON BONE FERTILIZER CO., TRENTON, N. J.			
139	Special Grain,	L. A. Howells, Morrisville,	8.77
JACOB TRINLEY & SONS, LINFIELD, PA.			
150	Raven Phosphate for All Crops,	A. M. F. Stitteler, Uwchland,	9.01
151	Trinley's Two, Eight, Five,	A. M. F. Stitteler, Uwchland,	8.73
F. W. TUNNEL & COMPANY, INC., PHILADELPHIA, PA.			
491	Excelsior Phosphate,	A. H. Kochler, Freemansburg,	9.92
TUSCARORA FERTILIZER CO., BALTIMORE, MD.			
198	Ammoniated Phosphate,	Lewis Geier, Slatington No. 1, ...	6.43

†Composite sample.

*Constituent falls below guaranty.

FERTILIZERS—Continued

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs. at point of selection.
Available.		Insoluble.	Total.		Present as Mu-late.	Present as Sulphate.	Total.		Water Soluble.	Available.	Inactive Insoluble.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
*8.03	10.00	1.34	9.37	.....	2.08	.....	2.08	2.00	.33	.29	c.20	.49	.42	13.76	16.25
*9.19	10.00	.82	10.01	.....	1.38	.....	1.38	1.00	.36	.....	.....	*.54	.32	16.08	19.20
10.81	10.00	2.32	13.13	.....	2.15	.....	2.15	2.00	.76	1.35	a.37	1.72	1.65	27.39	21.00
8.05	3.00	1.29	9.34	.....	1.38	.37	*1.70	2.00	.99	1.15	c.53	1.68	1.64	23.58	23.25
9.38	9.00	.89	10.27	.....	3.09	.....	3.09	3.00	.92	1.17	b.47	1.59	1.64	26.77	26.00
*8.38	9.00	1.64	10.00	10.00	2.00	.....	2.00	2.00	.81	.95	b.13	1.06	.32	21.80	21.00
8.41	8.00	.96	9.37	9.00	1.94	.....	1.94	2.00	.30	.39	c.15	.54	.41	16.87	19.00
8.51	8.00	1.39	10.43	9.00	2.41	.....	*2.41	3.00	.77	1.05	b.21	1.28	1.28	23.90	19.00
9.43	9.00	.86	10.29	9.50	.98	.....	*.98	3.00	.43	.66	b.27	.33	.32	19.69	21.00
8.05	8.00	.33	8.88	8.50	4.36	.....	*4.36	5.00	1.20	1.41	b.25	1.59	1.64	23.69	24.25
8.86	9.00	1.02	9.88	.....	1.16	.....	1.16	1.00	.63	.72	c.27	.99	.32	19.31	20.00
8.52	8.00	1.28	9.80	.....	1.86	.....	1.86	3.00	.44	.57	c.29	.86	.52	20.34	23.00
8.25	8.00	.78	9.13	.....	1.43	.....	1.43	1.00	.81	.92	c.26	1.18	.82	20.62	21.00
8.54	8.00	1.15	9.69	9.00	2.52	.....	2.52	3.50	.52	.73	a.10	.86	.82	21.62	27.00
10.38	10.00	.80	11.18	10.50	1.73	.....	1.73	1.50	1.06	1.47	b.29	1.76	1.65	25.70	25.00
9.87	9.50	.83	10.70	10.00	1.90	.....	1.90	2.00	.96	1.23	b.37	1.70	1.65	23.37	25.00
7.24	7.00	1.28	8.52	7.50	1.48	.....	1.48	1.00	.58	.71	c.24	.95	.32	18.95	20.00
10.28	10.00	1.09	11.26	10.50	2.63	.....	2.63	2.00	1.28	1.84	b.40	3.28	2.45	29.67	18.00
9.96	9.00	1.44	11.42	10.00	.60	.....	.60	.....	.92	1.46	a.32	1.78	1.64	23.48	22.00
9.25	9.00	1.70	10.95	10.00	2.67	.....	2.67	2.00	.78	.97	c.53	1.59	1.28	25.80	25.50
9.29	8.00	2.04	11.27	9.00	3.25	.....	3.25	3.00	.69	1.34	b.48	1.82	1.65	27.57	27.00
10.33	5.00	2.80	13.13	6.00	2.14	.....	2.14	1.00	.61	1.30	a.37	1.67	.82	26.97	.....
7.40	7.00	.57	7.97	7.50	1.40	.....	1.40	1.00	.40	.52	c.26	.78	.82	17.83	.....

a, b, c: Letters indicating the proportion of insoluble nitrogen that is inactive: a=2/5 or less; b=3/5; c=4/5 or more.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
323	J. E. TYGERT CO., PHILADELPHIA, PA. BY AM. AG. CHEM. CO. Early Truck Guano,	Geo. D. Miller, Mifflinville,	11.39
724	VIRGINIA CAROLINA CHEMICAL CO. FOR SALE BY BASIN MONUMENTAL CO. V. C. C. Co.'s Fish Bone & Potash,	McCalmont & Co., Bellefonte,	12.60
305	V. C. C. Co.'s Special for Wheat & Grass,	E. A. Slagle, Paxinos,	9.58
646	V. C. C. Co.'s Wheat & Clover Mixture,	E. B. Maurer, Boswell,	9.99
283	WOOLDRIDGE FERTILIZER CO., THE, BAL- TIMORE, MD. †Clover Leaf Crop Grower,	W. S. Stewart, Carlisle,	6.58
693	†Cyclone,	Grant Johnson, Millville,	8.11
252	High Grade Potato & Tomato Grower,	Frank Frederick, Cocalico,	5.44
254	†Old Hickory Phosphate,	W. S. Stewart, Carlisle,	6.57
238		Frank Frederick, Cocalico,	
253		Grant Johnson, Millville,	
694			
539	ROBT. A. WOOLDRIDGE CO., BALTIMORE, MD. Wooldridge's Ammoniated Phosphate,	S. H. Shearer, Seven Valley, R. D.,	10.46
41	†Wooldridge's Champion Stag Phosphate,	C. C. Catherman, Hartleton,	10.58
33		R. E. Brindle, Belleville,	
87	Wooldridge's Chieftian Phosphate,	J. J. Spangler, Littlestown,	10.00
88		J. J. Spangler, Littlestown,	
36	†Wooldridge's Farmers Favorite Cereal Special Compound,	R. E. Brindle, Belleville,	8.29
32	Wooldridge's Triumph Brand Special Phos- phate,	H. E. Heeston, Saltille,	9.41
350		John Frantz, Cressona,	
608			
575	YORK CHEMICAL WORKS, YORK, PA. Dempwolf's Crop Grower,	Hershey Store Co., Hershey, Pa....	5.96
541	Dauphin Brand,	H. E. Roberts, Oordorus,	6.43
106	Dempwolf's Half & Half,	H. M. Berkhelmer, Abbottstown,...	5.43
410	HENRY S. ZOOK, ELVERSON, PA. No. 6 Pride of Chester Phosphate for General Use,	J. K. Stoltzfus, Elverson,	4.98

†Constituent falls below guaranty.

‡Composite sample.

FIZERS—Continue.]

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.				Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 lbs. at point of selection.	
Available.		Insoluble.	Total.		Present as Muriate.	Present as Sulphate.	Total.		Water Soluble.	Available.	Inactive Insoluble.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.			Guaranteed.
7.49	6.00	.37	8.36	7.00	2.68	.....	2.68	2.00	2.31	2.85	b.43	3.28	3.29	32.12	.....
8.73	8.00	1.75	10.53	9.00	3.44	.....	3.44	3.00	.81	1.28	b.34	1.80	1.65	27.50	28.00
7.81	7.00	1.59	9.40	8.00	1.98	.....	1.98	2.00	.37	.....	.....	.53	.41	16.29	18.00
9.36	9.00	1.25	10.63	10.00	2.46	.....	2.46	2.00	.44	.56	b.17	*.77	.82	21.63	20.00
8.26	8.00	.41	8.67	8.50	.66	.....	.66	.50	.26	.36	c.21	.57	.41	15.86	{ 18.75
8.84	8.00	1.72	10.60	8.50	1.73	.32	2.05	2.00	1.52	2.08	b.61	2.69	2.47	20.80	{ 17.50
*8.54	9.00	.51	*9.05	9.50	1.27	5.10	6.37	3.00	1.30	1.51	b.30	1.81	1.65	24.72	.....
3.47	9.00	.46	9.93	9.50	1.24	.....	1.24	1.00	.78	.92	c.25	1.17	1.03	20.97	{ 21.75
															{ 21.25
7.94	8.00	1.91	9.85	9.00	1.24	.....	1.24	1.00	.73	.86	b.16	1.02	.82	19.58	{ 19.25
8.96	9.00	1.25	10.21	10.00	2.23	.....	2.23	2.00	.30	.91	b.15	1.06	.82	22.44	{ 21.86
7.90	8.00	1.59	9.49	9.00	2.50	.....	2.50	2.00	1.36	1.63	a.20	1.83	1.65	25.82	{ 21.00
5.19	8.00	1.13	9.37	9.00	1.95	.....	1.95	2.00	.46	.56	b.13	.69	.41	19.40	{ 20.50
8.59	8.00	1.33	9.92	9.00	2.96	.....	2.96	3.00	1.08	1.28	b.22	1.60	1.23	26.08	{ 22.50
															{ 20.00
*7.57	8.00	.83	8.29	8.50	.80	.10	.90	1.00	.85	.57	c.45	1.02	.82	18.04	{ 18.20
10.52	10.00	1.08	11.60	10.50	.80	1.44	2.24	2.00	.90	1.10	b.29	1.39	1.23	25.71	{ 21.00
7.75	7.00	.62	8.40	7.50	.60	.44	1.04	1.00	.41	.63	c.41	1.04	.82	18.74	{ 20.00
8.77	8.00	.33	9.15	9.00	2.68	.....	*2.68	3.00	.91	1.11	b.27	1.38	1.23	24.38	{ 24.00

a b c characters indicating the proportion of insoluble nitrogen that is inactive: a=two-fifths or less; b=two-fifths to three-fifths; c=three-fifths or more.

ROCK AND POTASH

Furnishing Phosphoric

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
AMERICAN AGRICULTURAL CHEMICAL CO., THE, NEW YORK.			
669	H. F. Gump & Sons, Inc., Dissolved Phosphate and Potash.	H. F. Gump & Son, Inc., Everett,	11.16
526	Bradley's Special Magic Phosphate,	Geo. R. Andrews, Enon Valley,	11.79
76		Greencastle Elevator Co., Greencastle.	
15	†Canton Chemical Soluble Phosphate and Potash.	W. B. Winey, Middleburg,	8.16
337	†Detrick's Soluble Phosphate and Potash.	H. L. Orr, Tyrone,	
405		Levi Berkey, Somerset,	9.43
730	†Great Eastern Soluble Acid Phosphate and Potash.	Wm. T. Hoover, Port Matilda,	
592		W. A. Klinger, Drum,	10.04
731		F. H. Clemons, Stormstown,	
673	†Maryland Bono Super Phosphate,	Diehl & Wolf, Lutsville,	
104		L. H. Miller, New Oxford,	9.85
790		S. M. Shuyler & Son, Liverpool, ...	
791	Maryland Linden Super Phosphate,	S. M. Shuyler & Son, Liverpool, ...	12.31
289	Moro Phillips' Wheat Special,	Nickles & Stuart, Shippensburg, ...	6.29
512	†North Western Electric Phosphate,	Farmers' Supply Co., New Castle, ...	8.50
706		Neyhard & Keller, Orangeville,	
342	Packers' Union Banner Wheat Grower,	Wm. I. Brown, Airydale,	10.46
782		W. A. Stover, Spring Mills,	
377	†Read's Champion Phosphate,	Robt. A. Daubach, Nazareth,	10.76
818		Amos Pennepacker, Bally,	
383	Read's Special Farmers' Reliable,	Alfred Shimer, Nazareth,	9.62
430		Wm. Hall, Danboro,	
23	†Reese's Grass and Grain,	H. H. Thomas, Beavertown,	8.26
532		J. F. Goodling, Loganville,	
677		E. L. Greist, Cesana No. 1,	
455	†Susquehanna Alkaline Phosphate,	H. P. Passmore & Bro., Oxford, ...	10.22
714		The J. N. Getz Co., Lock Haven, ...	
346	Wheeler's Wheat and Clover Fertilizer,....	L. P. Garver, Shirlleysburg,	10.30
AMERICAN FERTILIZING CO., BALTIMORE, MD.			
208	American Premium Phosphate and Potash.	S. K. Savidge, Valley View,	11.13
ARMOUR FERTILIZER WORKS, BALTIMORE, MD.			
678	†Phosphate and Potash,	Sewel Rowser, Alum Bank, No. 1,	8.13
475		Frank Douglass, Indiana,	
778		Ritter & Jacobs, Newport,	
ATLANTIC FERTILIZER WORKS, BALTIMORE, MD.			
639	Atlantic Farmers' Alkaline Mixture,	H. A. Cranmer, Monroeton,	8.37
BOWKER FERTILIZER CO., NEW YORK CITY.			
229	Bowker's Special Golden Harvest,	Samuel Carl, Spring Glen,	10.31
513	†Bowker's Super Phosphate with Potash, {	Marshall Bros., New Castle,	8.30
216		Geo. Maurer, Pitman,	
657		John A. Gant, West Newton,	
CHESAPEAKE CHEMICAL CO., THE, BALTIMORE, MD.			
683	†C. C. Co's Alkaline 10-1,	L. R. Over, Cunyville,	9.36
786		A. H. Ulah, Middletown,	12.22
735	C. C. Co's Alkaline 12-1,	A. H. Ulah, Middletown,	
COE MORTIMER CO., NEW YORK CITY.			
233	E. Frank Coe's Alkaline Phosphate and Potash Special.	Adolph Roettinger, Danville,	8.99
484	E. Frank Coe's Dissolved Phosphate and Potash.	R. A. Bertholomew, Sciota,	9.63
1	†E. Frank Coe's Famous Prize Brand {	M. W. Evey & Son, Lemont,	7.96
219	Grain and Grass Fertilizer. }	Chas. Schoffstall, Valley View,	

†Composite sample.

FERTILIZERS.

Acid and Potash.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.		
10.46	8.00	.81	11.27	9.00	1.35	.....	1.35	1.00	14.35	16.00
*11.28	12.00	1.48	*12.76	13.00	2.19	.....	2.19	2.00	16.67	19.00
10.25	10.00	.83	11.08	11.00	2.32	.....	2.32	2.00	16.00	16.50
10.53	10.00	.79	11.32	11.00	2.34	.....	2.34	2.00	16.35	18.00
10.41	10.00	.83	11.24	11.00	1.94	.....	1.94	2.00	15.45	17.00
10.43	10.00	.64	11.07	11.00	2.13	.....	2.13	2.00	15.81	18.00
11.17	11.00	.70	11.87	13.00	1.98	.....	1.98	2.00	16.00	17.25
10.02	10.00	.81	10.83	11.00	2.16	.....	2.16	2.00	15.63	16.00
9.97	10.00	.98	10.95	11.00	1.82	.....	*1.72	2.00	14.67	20.00
10.36	10.00	1.10	11.46	11.00	1.94	.....	1.94	2.00	15.56	16.25
9.87	10.00	.98	*10.80	11.00	1.77	.....	*1.77	2.00	14.71	19.15
11.84	12.00	1.27	13.11	13.00	2.14	.....	2.14	2.00	16.99	18.25
10.17	10.00	.82	10.99	11.00	1.83	.....	1.83	2.00	15.20	15.00
10.53	10.00	.61	11.13	11.00	2.04	.....	2.04	2.00	15.60	16.25
10.30	10.00	.97	11.27	11.00	2.08	.....	2.08	2.00	15.77	17.00
12.17	12.00	2.07	14.24	13.00	2.10	.....	2.10	2.00	17.22	17.50
*11.67	12.00	.65	12.32	12.50	2.00	.....	2.00	2.00	16.38	15.50
*9.60	10.00	1.11	10.71	.....	2.23	.....	2.23	2.00	15.00	20.00
*11.58	12.00	1.28	12.81	13.00	2.13	.....	2.13	2.00	16.74	17.50
9.92	10.00	.75	*10.67	11.00	1.88	.....	1.88	2.00	15.00	18.00
11.01	10.00	1.70	12.71	11.00	.88	.....	.88	1.00	13.90	15.00
*11.77	12.00	2.13	13.90	13.00	.92	.....	.92	1.00	14.50	16.00
*12.64	14.00	.66	*14.10	15.00	2.16	.....	2.16	2.00	17.91	16.00
*9.60	10.00	.98	*10.48	11.00	1.22	.....	1.22	1.00	13.40	20.00
10.15	10.00	.87	11.02	11.00	2.14	.....	2.14	2.00	15.69	15.50

*Constituent falls below guaranty.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
78	EASTERN CHEMICAL CO., NEW YORK. Eastern Golden Harvest,	Diehl, Omwake & Diehl, Greens- castle.	8.29
98	EUREKA FERTILIZER CO., LANCASTER, PA. Alkaline, No. 2,	N. E. Gobrecht & Bro., Hanover, ..	9.73
251	S. M. HESS & BROTHER, INC., PHILA- DELPHIA, PA.	S. D. Snyder, Meyerstown, R. D. No. 5.	8.93
718	{†Emporer Phosphate,	S. M. Hooley, Reedsville,	
274	M. P. HUBBARD & CO., BALTIMORE, MD. Hubbard's Soluble Phosphate and Potash,	I. F. Wright, Newville,	7.34
756	LEBANON FERTILIZER WKS., LEBANON, PA. Levan's Special Mixture Fertilizer,	David Houser, Annville,	7.25
775	FREDERICK LUDLAM COMPANY, BALTI- MORE, MD.	Jacob Fleisher, Shermansdale,	11.36
106	{†Ludlam Cecrops Fertilizer, On Top Special,	W. D. Myers, East Berlin,	10.33
777	{†Ludlam Cecrops Fertilizer, Phosphate and Potash,	Lewis Long, Elliottsburg,	
107	MILLER FERTILIZER CO., THE, BALTI- MORE, MD. Alkaline,	A. D. Brown, East Berlin,	10.46
587	NASSAU FERTILIZER CO., NEW YORK.	Philip Miller, Nescopeck,	10.44
586	{†Grass and Grain Fertilizer,	Francis Baker, Everett,	
623	{†Grass and Grain Fertilizer,	Daniel Rosenberger, Oley,	
788	G. OBER & SONS CO., BALTIMORE, MD. Ober's Dissolved Phosphate and Potash, ...	J. M. Sarver, Millersown,	8.86
121	PATAPSCO GUANO CO., BALTIMORE, MD. Baltimore Soluble Phosphate,	E. C. Thomas, Gettysburg,	10.62
125	FOR THE POLLOCK FERTILIZER C., BAL- TIMORE, MD., MFD. BY THE AM. AG. CHEM. CO.	F. S. Kelly, Gettysburg,	10.99
365	{†The Pollock Fertilizer Co's Soluble Phos- phate,	J. D. Garman, Mongol,	11.47
667	{†The Pollock Fertilizer Co's Victor Brand Phosphate,	Francis Baker, Everett,	
		Mills & Gerhardt, Kingwood,	
823	RASIN MOUNMENTAL CO., BALTIMORE, MD.	H. D. Miller, Mifflinville,	7.62
8	{†Rasin's Little Giant Phosphate and Pot- ash,	Bradford & Son, Center Hall,	
837	{†Rasin's Phosphate and Potash Revised,	L. A. Gelger, Joanna,	8.17
822	{†Rasin's Phosphate and Potash Revised,	Schlegel, Adams & Co., Fleetwood,	
702	{†Rasin's Vitoria Phosphate and Potash, ...	H. B. Low & Son, Orangeville,	13.83
178	{†Rasin's Vitoria Phosphate and Potash, ...	Henry K. Mohr, Quakerstown,	
48	{†Rasin's Vitoria Phosphate and Potash, ...	S. B. Miller, Mifflinburg,	13.83
703	{†Rasin's Vitoria Phosphate and Potash, ...	H. B. Low & Son, Orangeville,	
366	SCOTT FERTILIZER CO., THE, ELKTON, MD. Scott's Soluble Phosphate and Potash, 12x2,	William Beck, Easton, R. D. No. 4,	11.22
142	FOR THE SOUTHERN FERTILIZER CO., YORK, PA., BY AM. AG. CHEM. CO. Southern Fertilizer Co's Farmers' Mixture,	Bert Hoff, Spring Grove,	10.05
118	I. P. THOMAS & SONS CO., PHILADEL- PHIA, PA.	N. Guy Snyder, Aspers,	10.67
67	{†Alkaline Fertilizer,	L. S. Knezer, J. A. Martin, Mif- flintown,	
334	{†Alkaline Fertilizer,	F. F. Marty, Washingtonville,	

*Composite sample.

FERTILIZER—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.		
11.99	12.00	.54	13.53	.....	1.66	.....	*1.66	2.00	15.82	12.00
12.62	10.00	.55	13.17	11.00	.80	.....	*.80	2.00	14.48	14.00
10.62	10.00	.55	11.17	11.00	1.54	.....	1.54	1.00	14.70	{ 15.00
10.52	10.00	.92	11.44	11.50	2.10	.....	2.10	2.00	15.86	.....
11.97	12.00	1.22	13.19	13.00	1.57	.....	*1.57	2.00	15.75	.....
12.80	12.00	.81	13.61	12.00	2.15	.....	2.15	2.00	17.48	.....
10.14	10.00	.77	10.91	11.00	1.98	.....	1.98	2.00	15.86	{ 15.90 16.00
13.40	11.00	.67	14.07	11.50	1.96	.....	1.96	2.00	17.48	15.50
10.08	10.00	.77	10.86	11.00	2.10	.....	2.10	2.00	15.54	{ 17.00 16.50
10.77	10.00	1.33	12.10	11.00	2.32	.....	2.32	2.00	16.50	.....
11.57	11.00	.92	12.49	12.00	1.94	.....	1.94	2.00	16.06	17.00
10.58	10.00	1.01	11.59	11.00	1.82	.....	1.82	2.00	15.31	{ 15.50 16.00 15.00
10.68	9.00	.74	11.42	10.00	1.70	.....	1.70	1.00	15.08	{ 16.00 15.00
8.81	8.00	1.40	10.21	9.00	2.18	.....	2.18	2.00	14.88	{ 12.00 16.25 14.00 14.00 14.25 17.75
11.64	10.00	1.51	13.15	11.00	1.85	.....	1.85	1.00	15.21	.....
12.51	12.00	1.89	14.50	13.00	2.18	.....	2.18	2.00	17.06	.....
13.59	12.00	1.02	14.61	.....	2.52	.....	2.52	2.00	18.72	16.50
9.86	10.00	.94	*10.80	11.00	2.02	.....	2.02	2.00	15.21	15.50
9.88	10.00	.85	10.73	10.50	1.50	.....	*1.50	2.00	14.21	{ 16.00

*Constituent falls below guaranty.

ROCK AND POTASH

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
723	VIRGINIA CAROLINA CHEM. CO., RICHMOND, VA., FOR SALE BY BASIN MONUMENTAL CO. V. C. C. Co's Dissolved Phosphate and Potash.	McCalmont & Co., Bellefonte,	10.64
285 42 634	ROBT. A. WOOLDRIDGE CO., BALTIMORE, MD. } †Wooldridge's Special Old Sledge Phosphate.	{ W. S. Stewart, Carlisle, C. C. Catherman, Hartleton, V. A. Stuft, Imler, }	9.99
500 106 680	YORK CHEMICAL WORKS, YORK, PA. } †Dempwolf's Ten and One,	{ Geo. Edleman, Northampton, H. M. Berkhimer, Abbottstown, ... W. C. Saylor, Cessna, }	7.53

FERTILIZER—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.					Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.				
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.			
10.94	10.00	1.58	12.52	11.00	2.13	.....	2.13	2.00	16.48	19.00
12.90	14.00	.89	14.88	15.00	2.44	.....	2.44	2.00	18.86	{ 19.95 19.61 21.00
11.80	10.00	.77	12.57	10.50	.82	.....	.82	1.00	14.00	{ 12.75 14.00

DISSOLVED BONE

Furnishing Phosphoric

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
	BAUGH & SONS CO., PHILADELPHIA, PA.	
169	{†Baugh's Ammoniated Super Phosphate, .	Thomas Haines & Co., Malvern, .
102		H. H. Loose, Menges Mills, .
781		B. F. Horting, Newport, .
273	{†Baugh's Half & Half Mixture, .	Allison & Fogelsonger, Shippensburg, .
81		Cook Grain, Feed & Fert. Co., Dillsburg, .
348		M. J. Bowmaster & Co., Arlisonia, .
	BERG CO., THE, PHILADELPHIA, PA.	
247	{†Berg's Special Bone Manure, .	A. G. Bowman, Palmyra, .
424		Edw. F. Bracken, Paoli, .
	CENTRAL CHEM. CO., THE, THOMAS FERTILIZER WKS., HAGERSTOWN, MD.	
799	{C. C. C. Bone Compound, .	E. W. Rupp, Shiremanstown, .
469		John F. Hahn, Ebsenburg, R. D. No. 1, .
580		Edgar Hepler, Hepler, .
390	{C. C. C. Special Bone Mixture, .	E. S. Thomas, Hollsopple No. 2, .
237		Edgar Hepler, Hepler, .
798		E. W. Rupp, Shiremanstown, .
	COE MORTIMER CO., NEW YORK.	
391	E. Frank Coe's Basic Fruit & Legume Phosphate (Basic Lime Phosphate) (Key Plow Brand).	J. M. Croyle & Son, Boswell, R. No. 1, .
	EUREKA CHEMICAL CO., BALTIMORE, MD.	
661	Eureka Dissolved Animal Base, .	C. C. Davis, Greensboro, .
	JOSEPH R. GAWTHROP, KENNETT SQUARE, PA.	
157	Ammoniated Special Phosphate for Corn Oats & Wheat.	Jos. K. Gawthrop, Kennett Square, .
	GRIFFITH & BOYD CO., BALTIMORE, MD.	
542	{†Peerless Mixture, .	E. H. Steiner, Cordorus, .
28		Frank Hoyes, Reedsville, .
909		Harvey Hebner, Harrisburg, R. No. 1, .
759	Queen Guano, .	A. L. Hartman, Schaffersstown, .
	LEBANON FERTILIZER WORKS, LEBANON, PA.	
236	Levan's Wheat & Grass Fertilizer Special, .	A. J. Fidler, Sec., Grange No. 1258, Rock, .
	MARTIN FERTILIZER CO., PHILADELPHIA, PA.	
39	{†Martin's Crop Producer, .	Cook Grain, Feed & Fert. Co., Dillsburg, .
58		Buffalo Valley Farmers & Consumers Asso., .
446		Lewisburg, .
	MILLER FERTILIZER CO., THE, BALTIMORE, MD.	
135	W. G. Phosphate, .	Geo. C. Linebaugh, Dover No. 4, .
	OYLER & SPANGLER, GETTYSBURG, PA.	
117	Special, .	Oyler & Spangler, Gettysburg, .

†Composite sample.

*Constituent falls below guaranty.

FERTILIZERS.

Acid and Nitrogen.

Moisture in 100 pounds.	Phosphoric Acid in 100 Pounds.					Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 pounds at point of selection.
	Available.		Insoluble.	Total.		Water soluble.	Available.	Inactive—Insoluble.	Total.			
	Found.	Guaranteed.		Found.	Guaranteed.				Found.	Guaranteed.		
5.56	*10.01	14.00	1.96	11.97	.....	.56	.81	b.36	1.19	.82	19.61	{ 20.00 18.75 23.00 18.25 23.00
4.74	12.78	.....	9.08	21.86	19.00	.69	1.14	b.36	1.50	1.23	25.91	{ 25.00 25.00
5.43	12.08	7.00	3.25	15.33	11.00	.57	1.06	b.56	*1.64	2.00	23.13	{ 25.00 25.00
10.03	*13.39	14.00	.93	14.33	.....	.78	.98	b.23	1.21	1.25	21.16	23.00
5.55	*8.94	10.00	1.81	10.25	.....	.53	.65	b.17	.82	.82	15.58	{ 17.00 17.00 23.00
6.51	*9.06	10.00	2.00	11.06	.....	1.00	1.27	b.35	1.62	1.65	19.60	23.00
8.78	*11.30	12.00	1.22	12.52	.....	.64	.75	c.21	.96	.82	18.38	{ 18.00 21.00
6.82	12.33	13.00	.51	*13.09	14.00	.....	.....	.....	.34	.....	18.51	16.00
5.75	10.23	10.00	.65	10.88	10.50	.93	1.12	b.26	1.38	1.24	19.97	30.00
6.23	8.42	6.00	1.19	9.61	7.00	.57	1.39	b.34	2.23	1.50	19.60	26.00
6.05	9.59	8.00	1.56	11.15	9.00	1.16	1.32	b.22	1.54	.41	19.05	{ 15.25 19.00
6.48	8.84	9.00	2.74	11.58	10.00	.36	.56	b.28	.84	.85	16.36	19.00
5.76	*9.49	10.00	2.50	11.99	11.00	1.11	1.32	b.28	1.60	1.66	20.25	20.00
10.83	10.09	10.00	1.54	11.63	.....	.60	.78	c.47	1.25	1.03	18.74	{ 16.50 17.50
3.71	6.87	7.00	.42	*7.29	7.50	.22	.37	b.19	.56	.41	12.12	16.50
5.50	12.11	10.00	2.42	14.53	12.00	.41	1.00	a.23	1.28	.....	22.21	19.00

a, b, c: Letters indicating the proportions of insoluble nitrogen that is inactive: a=2/5 or less; b=2/5 to 3/5; c=3/5 or more.

DISSOLVED BONE FERTI

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
	READING BONE FERTILIZER CO., READING, PA.	
373	{†Animal Tankage Mixture,	Chas. Shimmel, Ackermanville,
69		J. M. Snakey, McAllisterville,
432	{†Dissolved Animal Matter,	John W. Root, Kimberton,
431		John W. Root, Kimberton,
376	{Never Fall Crop Grower,	Chas. Shimmel, Ackermanville,
825		J. W. Slipp, Birdsboro,
626	{†Reading Special Grass & Grain Producer,	Jacob D. Moyer, Bechtelville,
70		J. M. Snakey, McAllisterville,
442		Benj. F. Shearer, Dublin,
	READING CHEMICAL CO., READING, PA.	
521	{†Farmer's Favorite,	John W. White, Jamestown,
526		Jno. A. Smith, Birdsboro No. 1,
527	Reading Soil Builder,	Jno. A. Smith, Birdsboro No. 1,
	ROBERT A. REICHARD, ALLENTOWN, PA.	
202	Special Fertilizer,	No agent, Fogelsville,
	F. S. ROYSTER GUANO CO., BALTIMORE, MD.	
114	Royster's Pouquin Ammoniated Super-Phosphate,	Arthur Roberts, Gettysburg No. 5,
	TRENTON BONE FERTILIZER CO., TRENTON, N. J.	
190	Bone & Tankage,	L. A. Howells, Morrisville,
	F. W. TUNNEL & CO., PHILADELPHIA, Pa.	
168	Wheat Grower,	S. Carl Garner, Hatboro,
	UNION CHEMICAL WORKS, INC., NORTH WALES, PA.	
437	Three Ten Mixture,	Jesse Zeigler, Spring City, R. D.,
438	Two Twelve Mixture,	Jesse Zeigler, Spring City, R. D.,
	ROBT. A. WOOLDRIDGE CO., BALTIMORE, MD.	
86	Wooldridge High Grade Dissolved Animal Bone,	J. J. Spangler, Littlestown,
	YORK CHEMICAL WORKS, YORK, PA.	
411	Dempwol's Dissolved Animal Bone,	J. K. Stoltz, Liverson,
570	{†Dempwol's Two & Ten,	B. M. Hartman, Millersburg, R. No. 1, ..
576		Hershey Store Co., Hershey,

†Composite sample.

*Constituent falls below guaranty.

LIZERS—Continued.

Moisture in 100 pounds.	Phosphoric Acid in 100 Pounds.					Nitrogen in 100 Pounds.					Computed commercial value of 2,000 lbs. at Dept. rating.	Selling price of 2,000 pounds at point of selection.
	Available.		Insoluble.	Total.		Water soluble.	Available.	Inactive—Insoluble.	Total.			
	Found.	Guaranteed.		Found.	Guaranteed.				Found.	Guaranteed.		
7.06	*13.59	14.00	2.02	16.61	15.00	1.06	1.40	a.19	1.59	1.64	24.18	{ 26.00 25.50 27.00 20.00 24.00 21.00 23.00 18.50
5.66	*9.73	10.00	2.36	12.06	11.00	.57	.79	b.22	1.01	.82	17.66	{ 23.00 22.00 25.00
6.69	*9.50	10.00	1.97	11.47	11.00	.48	.73	b.22	.94	.82	17.02	{ 23.00 22.00 25.00
6.29	7.90	7.00	.73	8.63	8.00	.63	.83	a.12	.95	.82	15.01	{ 23.00 22.00 25.00
6.25	*9.21	10.00	1.00	*10.30	11.00	.56	.86	b.18	.86	.82	15.68	{ 23.00 22.00 25.00
7.02	*8.63	10.00	1.27	*9.89	11.00	.87	1.14	b.33	1.47	1.64	18.20	{ 23.00 22.00 25.00
4.73	*10.89	12.00	7.29	18.18	.....	.56	.94	b.33	1.27	1.43	22.22	.....
5.58	10.42	10.00	.92	11.35	10.50	.96	1.48	a.26	1.74	1.65	22.02	19.84
7.49	11.36	8.00	3.00	14.36	9.00	1.04	1.7	b.44	2.14	2.06	25.11	27.00
6.09	9.84	8.00	2.91	12.75	9.00	.91	1.13	b.16	1.28	.82	19.38	22.00
4.62	10.19	10.00	1.23	11.47	.....	1.61	1.96	b.30	2.28	2.46	23.47	24.50
4.81	*11.55	12.00	1.16	12.71	.....	1.16	1.4	b.24	1.66	1.64	21.67	21.50
10.66	12.29	12.00	2.13	14.42	14.00	1.76	2.66	a.15	2.18	2.06	25.33	25.00
6.20	16.27	12.00	2.08	18.35	16.00	1.11	2.13	a.36	2.54	2.47	30.48	30.00
4.69	9.97	10.00	.64	10.61	.....	1.17	1.44	b.21	1.65	1.65	19.99	{ 21.00

a b c characters indicating the proportion of insoluble nitrogen that is inactive: a=two-fifths or less; b=two-fifths to three-fifths; c=three-fifths or more.

ACIDULATED Furnishing

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
	AMER. AGR. CHEMICAL CO. THE, NEW YORK.	
103	{ 14% Acid Phosphate,	{ L. H. Miller, New Oxford,
121		
121		
656		
38	Great Eastern Dissolved Acid Phosphate,	A. B. Shoemaker, Tullytown,
	Packer's Union Superior Acid Phosphate,	A. H. Derstine, New Stanton,
		W. L. Grenoble, Mingoville,
	BAUGH & SONS CO., PHILADELPHIA, PA.	
63	{ Baugh's H. G. Acid Phosphate,	{ John Selber, Mifflintown,
5		
101		Robt. D. Forman, Center Hall,
		H. H. Loose, Menges Mills,
	BOWKER FERTILIZER CO., NEW YORK CITY.	
582	{ Bowker's Soluble Phosphate,	{ Samuel Carl, Spring Glenn,
514		
63		Marshall Bros., New Castle,
655		John A. Gant, West Newton,
276	{ Bowker's Special Sixteen,	{ W. D. Smith, Jefferson,
733		
		Jno. K. Beidler & Son, Oakville,
		W. B. Krebs, Milheim,
	CHESAPEAKE CHEMICAL CO., BALTI-MORE, MD.	
349	{ C. C. Co.'s Dissolved Phosphate 14%,	{ C. E. Starr, Three Springs,
359		
639	{ C. C. Co.'s Dissolved Phosphate, 16%,	J. S. Hershberger, Everett,
		J. L. Longenecker, Woodbury,
	COLUMBIA GUANO CO., BALTIMORE, MD.	
3	Columbia H. G. 16% Acid Phosphate,	J. H. Ross, Linden Hall,
	JOSIAH COPE & CO., BALTIMORE, MD.	
605	Acidulated Phosphate,	Jones Eaverson, Christiansa,
	EASTERN CHEMICAL CO., NEW YORK.	
351	Eastern Dissolved Phosphate,	Diehl, Omwake & Diehl, Richmond,
	EUREKA CHEMICAL CO., BALTIMORE, MD.	
564	{ Eureka Soluble Phosphate,	{ Jno. Schminkey, Gratz,
654		
		C. S. Funk, New Stanton,
	HUBBARD FERTILIZER CO., THE, BALTI-MORE, MD.	
683	{ Hubbard's 14% Phosphate,	{ Edgar Hartie, Osterburg No. 1,
793		
		J. E. Ellenberger, Liverpool,
	LANCASTER BONE FERTILIZER CO., LANCASTER, PA.	
383	{ Farmer's Economy,	{ John A. Cooper, Washingtonville,
457		
		Ira Bechtel, Roaring Springs,
	LEBANON FERTILIZER WORKS, LEBANON, PA.	
231	Levan's Acid Phosphate,	Horace Kinsey, Pine Grove,
	LISTER'S AGRICULTURAL CHEMICAL WORKS, NEWARK, N. J.	
339	{ Lister's Buyers Choice Acid Phosphate,	{ Benj. Everhart, Franklinville,
81		
606		S. A. Hostetter, Belleville,
763	{ Lister's High Grade Acid Phosphate,	{ Harry E. Miller, Christiansa,
794		
		Hiram Grub, Duncannon, No. 4,
		J. E. Ellenberger, Liverpool,
	MARTIN FERTILIZER CO., PHILADELPHIA, PA.	
372	{ Martin's Acid Phosphate,	{ Edwin Houck, Bangor,
57		
447		Buffalo Valley Farmers & Cons. Asso.,
59	Martin's Acid Phosphate, 16%,	Lewisburg,
		Harry Fyle, Cosart, Pa.,
		A. P. Lippy, Littlestown,
	MILLER FERTILIZER CO., THE, BALTI-MORE, MD.	
137	Acid Phosphate,	Geo. C. Linebaugh, Dover No. 4,

†Composite sample.

ROCK PHOSPHATE. Phosphoric Acid.

Moisture in 100 pounds.	Phosphoric Acid in 100 Pounds.					Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of selection.
	Available.		Insoluble.	Total.			
	Found.	Guaranteed.		Found.	Guaranteed.		
6.89	13.91	14.00	.74	*14.65	15.00	12.56	{ 12.00
5.23	14.51	14.00	1.40	15.91	15.00	12.11	{ 13.00
10.00	14.53	14.00	1.65	15.58	15.00	12.05	{ 15.00
8.24	16.16	14.00	.17	16.33	.....	13.98	{ 14.00
							{ 13.00
5.01	14.70	14.00	.90	15.63	15.00	13.14	{ 12.00
							{ 17.50
9.69	16.40	16.00	.85	17.25	17.00	14.23	{ 14.25
							{ 17.00
8.53	14.38	14.00	.79	15.17	15.00	12.86	{ 13.50
11.02	16.89	16.00	.86	17.25	17.00	14.45	{ 15.00
							{ 15.00
8.70	17.52	16.00	1.07	18.59	16.50	15.04	14.00
7.71	*13.74	14.00	.96	*14.70	15.00	12.50	13.00
10.28	14.62	14.00	.91	15.53	.....	13.09	13.50
7.08	14.41	14.00	1.06	15.47	14.50	12.96	{ 16.00
9.77	14.87	14.00	1.45	16.32	15.00	12.35	{ 13.00 13.50
9.23	13.88	14.00	.83	*14.20	16.00	12.45	{ 13.50 14.50
6.97	14.46	14.00	1.36	15.82	15.00	12.06	13.00
7.47	14.54	14.00	.79	15.33	15.00	12.90	{ 12.00 13.00 12.00
6.47	16.91	16.00	.64	17.55	17.00	14.52	{ 13.50
8.46	14.34	14.00	.39	14.63	.....	12.74	{ 13.00
7.85	16.85	16.00	.27	17.12	.....	14.38	{ 13.00 15.00
11.05	14.25	14.00	1.30	15.55	14.50	12.92	14.00

*Constituent falls below guaranty.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
690	NASSAU FERTILIZER CO., NEW YORK. Soluble Phosphate,	Philip Miller, Nescopeck,
277	PATAPSCO GUANO CO., BALTIMORE, MD.	John Taylor, Newburg,
771	{Patapasco H. G. Acid Phosphate,	{Chas. S. Brunner, New Bloomfield,
369	Patapasco Pure Dissolved S. C. Phosphate,	{Chas. Shimmel, Ackermanville,
124	PIEDMONT MT. AIRY GUANO CO., BALTIMORE, MD. Piedmont 16% Acid Phosphate,	H. D. & J. F. Bream, Gettysburg,
126	POLLOCK FERTILIZER CO., THE, BY THE A. A. C. CO., NEW YORK.	E. S. Kelley, Gettysburg,
2	{Pollock's Dissolved S. C. Phosphate, ...	{E. C. Ross, Lemont,
263	{Rasin's Acid Phosphate,	{J. D. Garmer, Mongol,
304	{Rasin's 16% Phosphate,	{E. A. Siagle, Paxinos,
143	{Rasin's 16% Phosphate,	{E. H. Keen & Co., Parkersburg,
320	{Rasin's 16% Phosphate,	{H. D. Miller, Middinville,
562	{Rasin's 16% Phosphate,	{Emanuel Boyer, Elksbethville,
674	{Rasin's 16% Phosphate,	{W. E. Hetzel, Ossana,
71	READING BONE FERTILIZER CO., READING, PA.	J. M. Swakey, McAllisterville,
427	{Soluble Dissolved Phosphate,	{Jacob D. Moyer, Bechtelsville,
806	READING CHEMICAL CO., READING, PA.	Dr. H. F. Guyer, Phila., Pa.,
828	{Clear Acid Phosphate,	{John A. Smith, Birdsboro No. 1,
524	SCHALL SHELTON FERTILIZER CO., BUFFALO, N. Y. Dissolved Phosphate,	John Morrison, Transfer, R. D.,
257	SCOTT FERTILIZER CO., ELLSTON, MD.	Eliaz Brubacher, Richland,
265	{Scott's Tip Top Soluble Phosphate,}	{William Beck, Easton, R. D. No. 4,
2064	STANDARD GUANO CO., BALTIMORE, MD. Standard Extra High Grade Acid Phosphate, 16%.	Chas. E. Gillett, Townsville,
336	FOR SOUTHERN FERTILIZER CO., YORK, PA., BY THE AM. AGR. CHEM. CO. Southern Fertilizer Co., Dissolved Phosphate.	J. G. Rishel, Jerseytown,
709	I. P. THOMAS & SONS CO., PHILADELPHIA, PA.	F. P. Davis, Bloomsburg,
263	{S. C. Phosphate,	{Geo. Hayden, Nazareth, R. D. No. 4,}
767	{S. C. Phosphate,	{C. F. Haas, Duncannon,
584	FOR THE J. E. TYGERT CO., PHILA., PA. BY THE AM. AGR. CHEM. CO. Acid Phosphate, 14%.	Geo. Miller, Middinville,
436	UNION CHEMICAL WORKS, INC., NORTH WALES, PA. Acid Phosphate,	Jessie Zeigler, Spring City, R. D.,
679	VIRGINIA CAROLINA CHEM. CO., BALTIMORE, MD., BY THE RASIN MONUMENTAL CO. V. C. C. Co.'s Guaranteed 14% Acid Phosphate.	Joseph Knisely, Alum Bank,
675	ROBERT A. WOOLDRIDGE CO., THE, BALTIMORE, MD.	Norman G. Miller, Ossana,
84	{Wooldridge's High Grade Acid Phosphate, ...}	{J. J. Spangler, Littlestown,
720	YORK CHEMICAL WORKS, YORK, PA.	{Wm. Bailey, Milroy,
360	{Dempwolf's Dissolved Phosphate,	{J. S. Herzhberger, Everett,
425	{Dempwolf's Dissolved Phosphate,	{Edw. F. Brachman, Paoli,

†Composite sample.

PHOSPHATE—Continued.

Moisture in 100 pounds.	Phosphoric Acid in 100 Pounds.					Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of selection.
	Available.		Insoluble.	Total.			
	Found.	Guaranteed.		Found.	Guaranteed.		
6.99	14.16	14.00	1.26	15.42	15.00	12.84	14.00
8.77	16.90	16.00	.45	17.35	17.00	14.47	{ 15.50 12.00
7.52	14.71	14.00	1.58	15.24	15.00	12.62	
10.94	16.00	16.00	.03	1.60	.....	13.98	15.50
7.22	14.41	14.00	.30	15.20	15.00	12.62	{ 12.50 12.00 13.00 15.00 13.50 15.00
8.21	15.20	14.00	1.15	16.25	15.00	13.51	
9.66	17.28	16.00	.83	15.16	17.00	14.84	
5.14	12.55	12.00	1.21	13.89	13.00	11.83	{ 15.00 17.00
10.35	14.61	14.00	.94	15.55	.....	13.06	{ 16.00
6.40	12.99	14.00	1.04	15.03	15.00	12.84	14.00
11.20	15.20	14.00	1.00	16.26	.....	13.63	{ 12.24 13.00
9.17	16.43	16.00	.92	17.40	16.50	14.31	11.13
8.75	14.72	14.00	1.19	15.92	15.00	13.20	12.00
10.40	15.34	14.00	.83	15.66	14.50	13.40	{ 11.75 12.50 14.00
7.70	14.23	14.00	.33	15.65	15.00	13.17	.....
5.74	14.87	14.00	.96	15.83	.....	13.36	15.00
10.70	14.70	14.00	1.12	15.82	15.00	13.17	14.00
9.55	17.11	16.00	.26	17.37	17.00	14.56	{ 13.00 13.36
10.79	15.99	14.00	.22	16.21	14.50	13.81	{ 14.00 14.00

*Constituent falls below guaranty.

GROUND BONE Furnishing Phosphoric

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
335 154 550	BAUGH & SONS CO., PHILADELPHIA, PA. †Baugh's Fine Ground Bone,	T. F. Garrison, Berwick, H. A. Mendenhall, Toughkenamon, Geo. W. Hottginger, Red Lion,
341	COE MORTIMER CO., NEW YORK CITY. Fine Ground Bone,	Thos. Conover, Saulsburg,
413	JAMES G. DOWNWARD CO., THE, COATESVILLE, PA. Pure Ground Bone,	Isaac Tomlinson, Huntingdon Valley,
283	LEBANON FERTILIZER WORKS, LEBANON, PA. Levan's Pure Fine Ground Bone Meal,	Horace Kinsey, Pine Grove,
426 690	LISTER AGRICULTURAL CHEMICAL WKS., NEWARK, N. J. †Lister's Bone Meal,	Wm. H. Fritz, Berwyn, Jacob Bousner, St. Clairsville,
341	NITRATE AGENCY CO., NEW YORK. Ground Bone, 8-50,	Samuel R. Wenger, Baresville, R. No. 1,....
129 732	G. OBER & SONS CO., BALTIMORE, MD. †Ober's Pure Raw Bone Meal,	D. Blocher & Co., Gettysburg, Wagner Geise, Bellefonte,
359	PATAPSCO GUANO CO., BALTIMORE, MD. Patapsco's High Grade Ground Bone,	J. J. Lehman, Hollsopple, R. D. No. 2,.....
127	FOR THE POLLOCK FERTILIZER CO., BALTIMORE, MD., BY AMERICAN AGR. CHEM. CO. Pure Raw Bone,	E. O. Kelly, Gettysburg,
149 212	RASIN MONUMENTAL CO., BALTIMORE, MD. †Rasin's Pure Raw Bone,	E. H. Keen & Co., Parkersburg, S. K. Savidge, Valley View,
329	READING CHEMICAL CO., READING, PA. Pure Ground Bone,	John A. Smith, Birdsboro, R. D. No. 1,.....
364	R. A. RIOHLAND, ALLENTOWN, PA. Raw Bone Meal,	E. J. Gerlach, Bethlehem,
451	SCOTT FERTILIZER CO., THE, ELKTON, MD. Scott's Pure Ground Raw Bone,	Mackey & Yerkes, Oxford,
474	SWIFT & CO., BALTIMORE, MD. Swift's Pure Bone Meal,	Geo. R. Stewart, Indiana, R. D. No. 4,.....
174 517	I. P. THOMAS & SONS CO., PHILADELPHIA, PA. †Pure Ground Bone,	I. S. Snyder, Sellersville, W. J. Moyer, Greenville,
153	JACOB TRINLEY & SONS, LINFIELD, PA. Pure Raw Bone Meal,	A. M. F. Stiteler, Uwchland,
485	UNION CHEMICAL WORKS, INC., NORTH WALES, PA. Raw Bone Meal,	Jessie Zeigler, Spring City, R. D.,
153	EMIL WAHL MFG. CO., PHILADELPHIA, PA. Emil Wahl's Pure Philadelphia Button Bone Meal,	H. A. Mendenhall, Toughkenamon,
136 412	YORK CHEMICAL CO., YORK, PA. †Dempwolf's Pure Ground Bone,	Farmers' Co-Op. Association, Dover, J. K. Stoltzfus, Elverson,

†Composite sample.

*Constituent falls below guaranty.

FERTILIZERS.

Acid and Nitrogen.

Moisture in 100 pounds.	Chemical Analysis.				Nitrogen.		Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of delivery.
	Mechanical Analysis.		Phosphoric Acid.		Diameter less than 1-50 inch. "Fine."	Diameter greater than 1-50 inch. "Coarse."		
	Found.	Guaranteed.	Found.	Guaranteed.				
4.94	53	47	17.74	16.49	2.72	2.47	26.53	{ 29.50 28.00 30.00
3.79	47	53	24.00	22.88	2.74	2.47	30.24	30.00
5.37	50	50	22.25	20.00	4.05	2.87	34.80	34.00
3.08	54	46	*24.71	27.00	2.44	2.55	30.68	27.00
5.22	57	43	*22.46	23.00	2.86	2.67	30.75	{ 27.50 31.00
4.27	78	22	28.78	22.88	2.85	2.46	35.23	32.00
6.76	60	40	23.59	21.00	3.96	3.70	36.08	{ 34.00
1.05	59	41	21.83	20.50	*2.88	3.29	30.67	35.00
7.24	50	50	*20.46	21.51	3.94	3.70	34.32	34.00
5.48	40	60	*18.85	20.60	4.26	3.70	32.45	{ 34.00 31.25
4.28	43	57	25.64	23.35	3.32	2.87	31.90	35.00
6.17	30	70	*21.51	23.00	3.80	3.70	31.89	40.00
6.94	50	50	25.00	21.50	3.84	3.30	36.00	35.00
4.17	75	25	27.14	24.00	3.16	2.47	36.85	30.00
3.11	52	48	23.45	23.00	2.49	2.46	29.33	{ 34.00 29.00
5.47	32	68	20.26	20.00	4.52	3.60	33.31	35.00
7.58	29	71	*20.33	21.00	4.24	3.60	32.76	33.00
11.69	67	33	25.69	24.50	*2.58	3.30	32.95	33.00
3.59	50	50	28.64	23.00	2.56	2.47	30.24	{ 30.00 33.00

a b c characters indicating the proportion of insoluble nitrogen that is inactive: a—two-fifths or less; b—two-fifths to three-fifths; c—three-fifths or more.

MISCELLANEOUS

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
832 533	AMERICAN AGRICULTURAL CHEMICAL CO., THE, NEW YORK. †Ground Tankage, 6-30,	Robert A. Daubach, Nazareth, Geo. Miller, Millville,	6.16
736	ASSOCIATED CHEMICAL CO., HAGERS-TOWN, MD. Animal Tankage,	John W. Bathgate, State College, ..	5.73
167	BERG CO., THE, PHILADELPHIA, PA. Berg's Animal Bone and Meat,	L. W. Danenhower, Southampton,...	4.69
163 840	NITRATE AGENCY CO., NEW YORK. Basic Slag (H. A. Brand), Ground Tankage,	Edward Briton & Son, West Chester, Samuel R. Wenger, Rareville, No. 1,	.19 7.33
590	REICHARD HIDE & TALLOW CO., ASH-LAND, PA. Tankage,	Grange No. 1413, John Kunkle, Agt., Mahanoy City.	4.36
855	C. O. YOUNG & CO., JOHNSTOWN, PA. B. B. Brand Packing House Fertilizer, ...	P. N. Casser, Johnstown,	3.43

†Composite sample.

*Constituent ails below guaranty.

FERTILIZERS.

Phosphoric Acid in 100 Lbs.					Potash in 100 Lbs.					Nitrogen in 100 Lbs.					Computed commercial value of 2,000 pounds at Department rating.	Selling price of 2,000 pounds at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive—Insoluble.	Total.				
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.			
.....	14.97	13.73	....	....	.....	....	1.57	2.92	b1.45	*4.37	4.95	33.47	{ 30.50	
.....	9.37	1.16	4.49	a1.61	*6.10	6.50	36.37	
.....	*16.23	17.00	.....	.....	.....	....	.84	2.56	a.67	3.23	3.30	30.19	33.00	
14.38	*16.21	17.00	.....	.....	.....	....	.....	.....	b2.15	5.67	5.75	33.56	36.00	
.....	8.60	6.86	.....	.....	.....	....	1.80	3.52	.....	.....	.....	.....	.....
.....	10.00	9.16	.....	.....	.....	....	3.45	6.07	a1.68	7.75	6.17	43.30	29.00	
.....	5.50	....	11.23	7.00	.....	.....	.....	.22	1.25	3.37	a1.13	4.50	3.00	31.02	25.00

a, b, c: Letters indicating the proportion of insoluble nitrogen that is intctive: a=2/5 or les; b=3/5 to 3/5; c=4/5 or more.



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DEPARTMENT OF AGRICULTURE

BULLETIN No. 278

Proceedings of the Thirty-Ninth Annual
Meeting of the

Pennsylvania State Board of Agriculture



HELD IN THE

CAPITOL, HARRISBURG, PA.
JANUARY 26 AND 27, 1916

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1916

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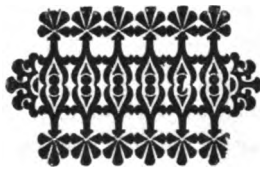
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MEMBERS

OF THE

Pennsylvania State Board of Agriculture

FOR THE YEAR 1918

MEMBERS EX-OFFICIO

HON. MARTIN G. BRUMBAUGH, Governor.
 HON. HENRY HOUCK, Secretary of Internal Affairs.
 DR. N. C. SCHAEFFER, Superintendent of Public Instruction
 DR. EDWIN ERLE SPARKS, President of the State College.
 HON. A. W. POWELL, Auditor General.
 HON. CHARLES E. PATTON, Secretary of Agriculture.

APPOINTED BY THE GOVERNOR

Mrs. Jean Kane Foulke, West Chester, Chester County,Term expires 1917

APPOINTED BY THE PENNSYLVANIA STATE POULTRY SOCIETY

W. Theo. Wittman,Allentown,.....1917

APPOINTED BY THE PENNSYLVANIA BEE-KEEPERS' ASSOCIATION

E. A. Weimer,Lebanon,1918

ELECTED BY COUNTY AGRICULTURAL SOCIETIES.

	Term expires.
Adams, .....A. I. Weidner, .....Arendtsville,	1918
Allegheny, .....C. L. Hood, .....Coraopolis, R. D.,.....	1918
Armstrong, .....S. S. Blyholder, .....Kelly Station,	1917
Beaver, .....Walter C. Dunlap, .....West Bridgewater,	1917
Bedford, .....Wm. F. Biddle, .....Everett,	1918
Berks, .....H. G. McGowan, .....Geiger's Mills,	1919
Blair, .....W. Frank Beck, .....Altoona,	1917
Bradford, .....Louis Piolet,.....Wysox,	1919
Bucks, .....B. Frank Wambold, .....Sellersville,	1917
Butler, .....Wm. H. Milliron, .....Marwood,	1917
Cambria, .....L. J. Bearer, .....Hastings,	1919
Cameron,	
Carbon, .....Edward Lienhard, .....Mauch Chunk,	1917
Centre, .....John A. Woodward, .....Howard,	1918

Terms expires.

Chester,	M. E. Conard,	Westgrove,	1918
Clarion,	J. H. Wilson,	Clarion,	1919
Clearfield,	T. L. Way,	Curwensville,	1919
Clinton,	Joel A. Herr,	Millhall,	1917
Columbia,	A. C. Creasy,	Bloomsburg, R. D.,	1919
Crawford,	W. F. Throop,	Espyville,	1918
Cumberland,			
Dauphin,	E. S. Keiper,	Middletown,	1917
Delaware,	Thos. H. Wittkorn,	Media,	1917
Elk,	John G. Schmidt,	St. Marys,	1919
Erie,	D. Warren De Rosay,	Corry,	1919
Fayette,	John T. Smith,	Dunbar,	1919
Forest,			
Franklin,	J. P. Young,	Marion,	1917
Fulton,	Frank Ranck,	Hancock, Md.,	1919
Greene,			
Huntingdon,	George G. Hutchison,	Warrior's Mark,	1918
Indiana,	S. C. George,	West Lebanon,	1919
Jefferson,	Peter B. Cowan,	Brookville,	1919
Juniata,	Matthew Rodgers,	Mexico,	1918
Lackawanna,	Horace Seamans,	Factoryville,	1919
Lancaster,	J. Aldus Herr,	Lancaster,	1917
Lawrence,	Doris L. Fulkman,	New Wilmington,	1919
Lebanon,	Edward Shuey,	Annville, R. D. 2,	1919
Lehigh,	P. S. Fenstermacher,	Allentown,	1918
Luzerne,	J. E. Hildebrant,	Dallas,	1918
Lycoming,	B. F. Kahler,	Hughesville,	1918
McKean,	E. A. Studholme,	Smethport,	1919
Mercer,	W. C. Black,	Mercer,	1917
Mifflin,	C. M. Smith,	Lewistown,	1919
Monroe,	F. S. Brong,	Saylorsburg,	1919
Montgomery,	John H. Schultz,	Norristown,	1917
Montour,	J. Miles Derr,	Milton, R. D.,	1919
Northampton,	C. S. Messinger,	Tatamy,	1918
Northumberland,	Wm. A. Fisher,	Milton,	1919
Perry,	Clark M. Bower,	Blain,	1919
Philadelphia,	David Rust,	Philadelphia,	1919
Pike,	B. F. Killam,	Paupack,	1918
Potter,			
Schuylkill,	John Shoener,	Orwigsburg,	1919
Snyder,			
Somerset,	Robert W. Lohr,	Boswell,	1917
Sullivan,	G. Eugene Bown,	Forksville,	1918
Susquehanna,	Dr. E. E. Tower,	Hallstead,	1919
Tioga,	C. H. DeWitt,	Mansfield,	1917
Union,	J. Newton Glover,	Vicksburg,	1917
Venango,	Homer C. Crawford,	Cooperstown,	1917
Warren,	R. J. Weld,	Sugargrove,	1917
Washington,	Jas. M. Paxton,	Houston,	1917
Wayne,	W. E. Perham,	Varden,	1917
Westmoreland,	W. F. Holtzer,	Greensburg,	1919
Wyoming,	G. A. Benson,	Tunkhannock,	1919
York,	Geo. F. Barnes,	Rossville,	1917

OFFICERS

PRESIDENT

Hon. Martin G. Brumbaugh, Harrisburg.

VICE PRESIDENTS

P. S. Fenstermacher, Allentown.
S. S. Blyholder, Kelly Station.
E. A. Studholme, Smethport.

EXECUTIVE COMMITTEE

Matthew Rodgers, Chairman, Mexico.
W. F. Biddle, Everett.
J. Aldus Herr, Lancaster.
B. F. Killam, Paupack.
W. F. Throop, Espyville.
W. Frank Beck, Altoona.
Hon. H. G. McGowan, Geiger's Mills.
C. M. Bower, Blain.
Charles E. Patton, Secretary, Ex-officio, Harrisburg.

ADVISORY COMMITTEE

Joel A. Herr, Chairman, Millhall.
B. F. Killam, Paupack.
E. E. Tower, V. M. D., Hallstead.

LEGISLATIVE COMMITTEE

Hon. H. G. McGowan, Chairman, Geiger's Mills
C. H. DeWitt, Mansfield.
Hon. Robert W. Lohr, Boswell.
Matthew Rodgers, Mexico.
George G. Hutchison, Warrior's Mark.

COMMITTEE ON RESOLUTIONS

J. Newton Glover, Chairman, Vicksburg.
Col. John A. Woodward, Howard.
B. Frank Wambold, Sellersville.
John Shoener, Orwigsburg.
Louis Piolett, Wysox.

MEMORIAL COMMITTEE

Joel A. Herr, Chairman, Millhall.
C. M. Smith, Lewistown.
Col. John A. Woodward, Howard.

CONSULTING SPECIALISTS

Botanist,	Prof. F. D. Kern,	State College.
Pomologist,	Chester J. Tyson,	Flora Dale.
Chemist,	Dr. William Frear,	State College.
Vet. Surgeon,	Dr. C. J. Marshall,	Harrisburg.
Sanitarian,	Dr. S. G. Dixon,	Harrisburg.
Microscopist and Hygienist,	Prof. J. W. Kellogg,	Harrisburg.
Entomologist,	Prof. H. A. Surface,	Harrisburg.
Ornithologist,	Dr. Joseph Kalbfus,	Harrisburg.
Meteorologist,	Prof. W. G. Owens,	Lewisburg.
Apiarist,	H. C. Klinger,	Liverpool.
Economic Geologist,	Prof. Baird Halberstadt,	Pottsville.
Agricultural Geologist,	W. H. Stout,	Pinegrove.
Forests and Forestry,	Irvin C. Williams,	Harrisburg.
Feeding Stuffs,	G. G. Hutchison,	Warrior's Mark.
Soils and Crops,	Prof. Franklin Menges,	York.

STANDING COMMITTEES

CEREALS AND CEREAL CROPS

J. Aldus Herr,Lancaster.

ROADS AND ROAD LAWS

Col. John A. Woodward,Howard.

FRUIT AND FRUIT CULTURE

A. I. Weidner,Arendtsville.

DAIRY AND DAIRY PRODUCTS

R. J. Weld,Sugargrove.

FERTILIZERS

F. S. Brong,Saylorsburg.

WOOL AND TEXTILE FIBERS

Doris L. Fulkman,New Wilmington.

LIVESTOCK

W. C. Black,Mercer.

POULTRY

W. Theo. Wittman,Allentown.

Proceedings of the Thirty-Ninth Annual Meeting of the State Board of Agriculture, Held in the Caucus Room of the House of Representatives, Capitol Building, Harrisburg, Pa.

Harrisburg, Pa., January 26, 1916, 9 A. M.

Mr. F. D. Kerrick in the Chair.

The CHAIRMAN: Members of the State Board: It is with great pleasure that I look into your happy faces and extend our greetings. We will proceed at once.

MR. HUTCHISON: I nominate Mr. Weld Assistant Secretary of the Board.

The nomination was seconded and Mr. Weld was elected Assistant Secretary.

The CHAIRMAN: First in order is the roll call.

The roll was then called and on this and subsequent calls, the following members responded to their names:

Hon. Martin G. Brumbaugh, Governor; Dr. Edwin Erle Sparks, President of the State College; Hon. Henry Houck, Secretary of Internal Affairs; Hon. Charles E. Patton, Secretary of Agriculture: Mrs. Jean Kane Foulke, West Chester, Chester county; W. Theo Wittman, Penna. State Poultry Society; E. A. Weimer, Penna. Bee-Keepers' Association; A. I. Weidner, Adams county; C. L. Hood, Allegheny county; S. S. Blyholder, Armstrong county; Wm. F. Biddle, Bedford county; W. Frank Beck, Blair county; F. D. Kerrick, Bradford county; B. Frank Wambold, Bucks county; Edward Leinhard, Carbon county; John A. Woodward, Centre county; H. G. McGowan, Berks county; Louis Piollet, Bradford county; L. J. Bearer, Cambria county; M. E. Conard, Chester county; J. H. Wilson, Clarion county; T. L. Way, Clearfield county; Joel A. Herr, Clinton county; A. C. Creasy, Columbia county; W. F. Throop, Crawford county; E. S. Keiper, Dauphin county; Thomas Wittkorn, Delaware county; John G. Schmidt, Elk county; D. Warren DeRosay, Erie county; John T. Smith, Fayette county; Frank Ranck, Fulton county; Geo. G. Hutchison, Huntingdon county; S. C. George, Indiana county; Peter B. Cowan, Jefferson county; Matthew Rodgers, Juniata county; Horace Seamans, Lackawanna county; J. Aldus Herr, Lancaster county; Doris L. Fulkman, Lawrence county; Edward Shuey, Lebanon county; P. S. Fenstermacher, Lehigh county; J. C. Hildebrant, Luzerne county; B. F. Kahler, Lycoming county; E. A. Studholme, McKean county; W. C. Black, Mercer county; C. M. Smith, Mifflin county; F. S. Brong, Monroe county; John H. Schultz, Montgomery county; J. Miles Derr, Montour county; C. S. Messinger, Northampton county; Wm. A. Fisher, Northumberland county; Clark M. Bower, Perry county; B. F. Killam, Pike county; David

Rust, Philadelphia county; John Shoener, Schuylkill county; Robert W. Lohr, Somerset county; G. Eugene Bown, Sullivan county; Dr. E. E. Tower, Susquehanna county; C. H. DeWitt, Tioga county; J. Newton Glover, Union county; Homer C. Crawford, Venango county; R. J. Weld, Warren county; Jas. M. Paxson, Washington county; W. E. Perham, Wayne county; W. F. Holtzer, Westmoreland county; Geo. A. Benson, Wyoming county and Geo. F. Barnes, York county.

The following Consulting Specialists were present: Botanist, Prof. F. D. Kern; Pomologist, Chester J. Tyson; Chemist, Dr. Wm. Frear; Vet. Surgeon, Dr. C. J. Marshall; Sanitarian, Dr. S. G. Dixon; Microscopist and Hygienist, Prof. J. W. Kellogg; Entomologist, Prof. H. A. Surface; Ornithologist, Dr. Joseph Kalbfus; Meteorologist, Prof. W. H. Owens; Apiarist, H. C. Klinger; Economic Geologist, Prof. Baird Halberstadt; Agricultural Geologist, W. H. Stout; Forests and Forestry, Irvin C. Williams; Feeding Stuffs, G. G. Hutchison and Soils and Crops, Prof. Franklin Menges.

The CHAIRMAN: Next in order is the reading of the minutes of the Spring Meeting.

Assistant Secretary Weld then read the minutes of the Spring Meeting.

The CHAIRMAN: Gentlemen, you have heard the minutes; what is your pleasure?

MR. HUTCHISON: I move that they be adopted.

The motion was seconded and carried.

The CHAIRMAN: Next on our program is the appointment of the Committee on Credentials. I will appoint as this Committee Mr. P. S. Fenstermacher, B. Frank Wambold and George F. Barnes. The Committee will please come forward and take the credentials. Next we have reports of Standing Committees and Specialists, of which the first is "Cereals and Cereal Crops," by Edward Leinhard, Chairman.

Mr. Leinhard then presented the following report:

REPORT OF COMMITTEE ON CEREALS AND CEREAL CROPS

By EDWARD LEINHARD, *Chairman.*

The year 1915 shows a higher value in cereal crops produced than any former year. Wheat, corn, oats, rye and potatoes—a total of 6,104,695,000 bushels, with an estimated value of \$3,504,129,000—was 5 per cent. higher than the crop of 1914 and 25 per cent. above the five year average. The increase in value of crops was due to the increase in number of bushels produced.

WHEAT

The premature reports of the enormous crop of wheat for 1915 has materialized as fully as predicted by the authorities at Washington, the total production for the country being 1,001,505,000

bushels, valued at \$930,302,000. The number of bushels for this State is estimated at 24,928,000, produced on 1,312,000 acres, the average yield being 19 bushels per acre, while the yield for the United States is 16.9 bushels an acre, an increase of 2.3 bushels above the 5 year average. The price per bushel was 6.6 cents less than 1914—92 and 98.6 cents, respectively. The damage by the Hessian fly in this State was only about one-half as great as in 1914; over one-half of the counties being affected, Berks county suffering the most, about one-fourth of the crop being affected.

CORN

The estimated value of the corn crop was 1.8 per cent. more than for 1914. The total value of the crop for the country was \$1,755,859,000. The average number of bushels per acre is 28.2 bushels per acre, with 108,321,000 acres seeded, producing a total of 3,054,535,000 bushels. This State produced 54,792,000 bushels on 1,522,000 acres. With an average of 36 bushels per acre it was 3 bushels less per acre than in 1914. This was due to the wet weather during the growing season interfering with necessary cultivation, especially on low grounds. Very little damage was done by frost; by the time that the first frost or freezing occurred, most of the corn had matured to such an extent that no extensive damage was done.

OATS

The oats crop for this country was 1,540,362,000 bushels with an average of 37.8 bushels per acre, or 8.1 bushels more per acre than in 1914 and 7.5 bushels above the five year average. Our State is 14th in the production of oats, having harvested 1,094,460 acres with an average of 39 bushels per acre, a total of 43,095,000 bushels and the estimated value \$19,823,700.

RYE

The average production of rye in the State was about the same per acre as in the two previous years, 17.2 bushels per acre. The area harvested was 271,600 acres and the yield 4,672,000, the estimated value being \$3,971,200. Pennsylvania ranks fourth in the production of rye; Wisconsin, Michigan and Minnesota leading in the order named.

BUCKWHEAT

The acreage of buckwheat was increased by 14,000 acres and the production 1.7 bushels less per acre than in 1914, and .1 bushel per acre less than the five year average. The estimated production of the country is 15,769,000 bushels. This State is first, with a yield of 5,540,000 bushels.

HAY

Hay ranks third in value compared with the other crops. The yield for the country—85,225,000 tons,—valued at \$912,320,000, being an increase of \$133,000,000 over the 1914 crop. This increase is due to the fact that there was 1,830,000 acres more in grass; also that the yield was increased by one-fourth ton per acre. The value per ton was 42 cents less than in 1914. The area cut for hay in this State was about 4 per cent. less than last year, producing a total

of 3,558,000 tons, at an estimated value of \$57,572,200. The Pennsylvania farmer should give more attention to the raising of grass, because it increases the fertility of the soil, especially when clover is raised.

POTATOES

Pennsylvania stands sixth in the production of potatoes. The average yield was only 72 bushels per acre, selling at an average price of 75 cents per bushel. The average yield for the country was 95.5 bushels per acre and the average price nearly 62 cents per bushel. About 22 per cent. of the crop in this State was affected by rot, ranging from 7 to 50 per cent. in different counties. The total production for this State was 20,502,000 bushels, being nearly 8,000,000 bushels short of 1914.

According to the fall report, the acreage sown to winter wheat is 11.3 less than the preceding year. The acreage of rye is 3 per cent. less than 1914. The condition of these crops are favorable throughout the country.

The average prices on all cereals, with the exception of potatoes, were less per bushel than in 1914, this being due to the enormous crops produced and high ocean freight rates on exports. During September, October and November, 1915, the rates on wheat from New York to Liverpool were 37.22 cents per bushel, or more than four times the average for the corresponding three months in 1914; also during this period—September, October and November, our exports show 10,000,000 bushels less than the corresponding three months of 1914, while Canadian exports show an increase of 58,000,000 bushels in the same time.

But, on the whole, it has been a good year for the American farmer. The valuation of the different crops is considerable above the five year average and an increase of 9 per cent. as compared with 1914. Statistics also show that the farmer has learned to rotate his crops so as to get legumes or clover crops in the rotation. Since the early 90's, the tendency of crop production has been upward, and for the past 25 years the production per acre of crops for the country has been increasing at the rate of nearly 1 per cent. per year. With the encouragement the farmer receives from the State and Nation, and the instruction from Agricultural institutions, the American farmer is learning how to farm.

The CHAIRMAN: Gentlemen, you have heard the report; what is your pleasure?

It was moved and carried that the report be received and printed.

The CHAIRMAN: Is there any discussion on this report? If there is none, we will proceed with the next report, "Roads and Road Laws," by Col. J. A. Woodward, Chairman.

Col. Woodward then presented the following report:

REPORT OF COMMITTEE ON ROADS AND ROAD LAWS

By J. A. WOODWARD, *Chairman*.

At the Spring meeting of the State Board of Agriculture, at Lock Haven, in 1884, before your speaker was a member, he accepted the honor of an invitation to address that body upon the subject of

"Country Roads," assigned him by the then Secretary, the lamented Thomas J. Edge. The change in the personnel of the body between that date and this is almost absolute—but a single member who then held a seat, remaining a member at this time: Reference is made to the venerable Joel A. Herr, of Clinton county. May many years be added to his useful life and membership.

The great majority of those who then composed the body, including every ex-officio and every appointive member, and the great secretary, have passed. The organization remains, more representative, more widely known, perhaps; but not more disinterested or efficient in the care and consideration it gives to the agricultural interests of the State than then.

The change in the component membership of this body is not more radical than is that in the road problem which it was then, for the first time, and is now, discussing, whether we think of those who build and use the road, or the volume and character of the traffic which it must accommodate; and doubtless the end is not yet in sight. Then, outside the cities and boroughs, and aside from the hoary and obsolete turnpike, "the road," as known throughout the State, was the common dirt road, the township road, the country road. The traffic upon it was in comparatively light loads, horses drawn at a speed of from two to ten miles per hour, and for short distances.

The construction and maintenance of it had for its highest authority and directing force the township supervisor, which title was only too often a synonym for inefficiency, or "unpreparedness," to borrow a word from present day political discussions; and who was for the period of his official life, a fine example of absolutism and autocracy over all road matters within his district, and within legally defined limits. He levied a certain or uncertain amount of tax upon his neighbors, who congregated at a designated point at his call and "worked out the tax," with no standard to guide and no authority to judge, other than that of the autocratic supervisor. Down to 1887, no tax payable in money could be levied nor collected except by order of the county court to pay an obligation already incurred for some special purpose. In that year it was written—see pamphlet Laws, 1887, Act No. 140—that the supervisors "may, and they are hereby authorized to collect, annually, in cash, not exceeding twenty-five per centum of the rates for the purchase of implements and materials as may be found necessary;" and your speaker had the valued honor of aiding in the enactment of that law, and personally amending it by the introduction of the word "materials," that a supervisor might, in time of dire need, purchase and pay for a plank or bit of timber with which to patch a broken down bridge across a little run, or buy a pick handle of a store-keeper who did not happen to be a tax payer in the same road district.

This is a brief summary of the legal machinery, power and resources for making and maintaining the one hundred thousand miles—I am using round numbers—of Pennsylvania's country roads until within the period of a single generation.

The highest types of road known were the McAdam and the Telford, which was simply a solid base for the McAdam where needed, and in a general way they were well guarded by toll gates. That a con-

siderable number of these moss-grown relics of pioneer days remain is a serious reflection upon the practical, common sense business qualifications of the people of Pennsylvania.

Now, the buggy, carriage or coach, of light weight and horse-speed, is largely superceded by the self-driven, heavy automobile going at twelve to forty miles an hour. The old, lofty Conestoga wagon, with its broad tires contributing to the permanence of the road upon which it traveled at two to three miles per hour, has given way to the ten to twenty ton truck at fifteen to twenty miles per hour.

These changes have reduced the McAdam and Telford types of road to second and third class, and made the archaic medley of old time road laws "mere scraps of paper." The road supervisor has been shorn of his autocracy, and becomes an adjunct of a State Department of Highways; and the old country road beginning at the borough line and extending to the suburban turnpike. Here let us halt.

Its efficient and available substitute, the new highway that will sustain and repel the attacks of the new, exacting and aggressive traffic, has not yet been discovered, and it is not the function of this Board, nor of its Committee to discover it. This is one of the first and most important duties of the Department of Highways. It is clothed with abundant power to secure, and equipped with funds *ad libitum* to pay for, the services of engineers and scientists whose high attainments are doubtless equal to the task. That a road which will successfully withstand the assaults of this wonderful engine of destruction can be made goes without saying; but to this time it has not been made excepting at such large costs as to make it unavailable under present conditions.

The one plain fact is that the whole public road theme, (indeed the whole subject of transportation in its largest dimensions) from the mud road to the Lincoln Highway, from the township supervisor to the State Highway Commissioner, from the two-mill tax to the fifty million dollar bond issue; from the wheelbarrow to the luxurious touring car or my lady's \$10,000 limousine, is in a state of evolution.

The transportation of any and everything, which is transportable, from a thought to an army, must, in this day and generation, be conducted at top-notch speed. Whether it be hurled across a continent, forced over or under the seas, or flung through the air, the movement must as nearly as possible annihilate time and space, and the multiplied and complex problems of transportation involved are the most important ones which we, as state or nation, can consider, excepting, possibly, the German, or our own, submarine. The relatively small section of this tremendous whole, as bounded by the title "Roads and Road Laws of Pennsylvania," covering an hundred thousand miles of public roads, and almost as many miles, if they might be measured in miles, of complex, overlapping, and often illy considered road laws, whose most prominent characteristic is their intricate verbosity, which is at present before us, is far too large to be more than glanced over in a paper of this kind.

Let it be briefly said that the wonderful changes in both the Roads and Road Laws of Pennsylvania, which have occurred in the third of a century since this body first took cognizance of the road question, have been steadily and rapidly though not uniformly, in the direc-

tion of improvement; and the modifications in the traffic which they permit and encourage have, in a general way, added very largely to the sum total of comfort, convenience and pleasure of the people.

As an agency in the advancement of civilization, easy, comfortable, rapid, safe and cheap transportation holds a place, than which none other holds a greater; and it is a subject of gratulation that in all of these qualifications the roads of Pennsylvania have made substantial progress within the period named. In the main, our legislation has been propitious, and its administration might easily have been worse though neither has been by any means, above criticism. In speaking thus your Committee has reference to all road laws and to all road administrations, from the youngest and most inexperienced supervisor in Podunk township to the chief highwayman, and is not knocking.

The promise for a more rapid progress in good roads is bright. The general public has learned much and is learning faster than ever before. A larger proportion of the people than ever before know what good roads are, and have a deep sense and wide-spread realization of their urgent need of it, and when the people get so far as this in knowledge, they will soon get farther and know how to get what they need.

The recognition of our law-making bodies of the necessity for the utilization of the highest possible degree of science and skill, and of a centralized control, in the furtherance of the good roads project, is evidenced by the erection of a Department of Highways, and the large powers and somewhat liberal appropriations with which they have imbued it. Notwithstanding the considerable current of adverse criticism which has been directed against it, some of which doubtless has been well earned, your Committee desires to express its confident hope and belief that through its agency there will ultimately come about, gradually improving in quality and decreasing in cost, a realization of the road users dream; a large percentage of the more important roads of the State, equitably apportioned—typified by the present system of inter-county State Highways—which shall be of easy grade, safely guarded at dangerous places, dry and smooth at all seasons of the year, hard enough to withstand the attacks of the fastest, and sufficiently well based to endure without flinching the impact of the heaviest traffic to which it may be submitted. A large proposition? Yes! But if there is any state in the Union that has the science, skill, money and material to solve it, Pennsylvania is that state. And the Department of Highways is our agency for the application of these splendid facilities to the solution of the problem. While it may not be the best possible agency for the purpose it is the only one we have or are likely to have. It is here, it has been here long enough to be settled in its bearings, and it is here to stay.

Now let us make the best possible use of it. If, in years gone by—whether with or without reason does not matter now—it lost our confidence to such a degree that we refused to give it the fifty millions it asked for with which to do a part of this big job, and is now making honest and energetic efforts to regain that confidence, let us meet it half way, and a little more; and when it has shown, like the Missouri mule, that it can and will be real good, we will authorize the bond issue and buy the bonds ourselves. We can do

it as easy as turn our hands. Something less than a century ago, when we were comparatively young and poor, we wanted better transportation facilities quite as much as we do now, and in that day canals were the best things we knew, so we undertook a system of water ways—low ways, if your please—and we authorized a bond issue of forty millions and built them through a commission. They served their purpose, were superceded by the railways, went into a condition of “innocuous desuetude,” and the bonds were all paid off long ago, no one being the worse for it. We can do far more than that now and not half try. It is up to the Department to show us that it will discreetly and honestly spend, on this inter-county highway, eight or nine thousand miles long, with a fair share to the township road, and it can have the money, and we will all have the roads.

But what of this eighty or ninety thousand miles of township road, dirt road, just road, and sometimes hardly that? The road that we farmers used to get out to and connect up with the (sometimes twenty-two-thousand-dollars-per-mile) intercounty highway? That's the road which this body, representing the farmers of every county of the State, is most concerned with. The road that takes our produce to the railway station and the market; and ourselves and our families to school and to church and to the polls; the road the R. F. D. man uses to bring us our mail; the road that we use and that is used for us three hundred and sixty-five days every year; and over which, when in days unnumbered we are carried to the bit of green sward “by the little brown church in the vale.”

The road system of state, or nation, for that matter, may well be compared to the arterial system of our bodies; The main arteries carrying the traffic of blood to the several main sections of the body are first to be considered of course, in order to establish the system, but the smaller and more distant ones, even smallest and most distant ones, those which supply the constant needs of the skin, hair, nails, away at the outermost boundaries of the frame, are equally important with the larger ones to the welfare of the whole body; and if they are permitted to get out of order or fail in any degree to perform their functions, to that same degree the whole system suffers. So with the township dirt road; it is quite as important to the welfare and prosperity of the whole State as is the inter-county highway, and must be maintained in the same relative degree of excellence. It must be smooth, dry and hard for at least ten months of the year, excepting only the periods of Spring thaws and excessive rains. How shall this be done? By road laws? Witness the failure of the hundreds and hundreds of laws enacted during the dead century, and now reposing deservedly in the scrap heap. By the autocracy of the unequipped supervisor? His inefficiency has been fully demonstrated. By “working out the road tax?” Enough has already been wasted in Pennsylvania by this egregious folly to duplicate the Appian Way from Philadelphia to Erie.

State aid, in science, skill and money, properly understood, broadly interpreted, liberally applied, is at this time the best available instrumentality in sight. State aid, I say, not State assumption nor substitution. The local forces of men and means must be aided, not cut out. The township unit should remain: it is the best road district, under present conditions that can be made; and all its in-

herent powers be utilized to the best possible advantage. The old time supervisor, too often unqualified and always independent in action, has already been superseded by the act of April 12, 1905, by an organized Board of Supervisors, three in number. This body is continuous in its structure by the election of one at a time, acts as a board, and, usually one or more of the best qualified citizens of the township in its membership serves as a most valuable agency for connecting up the Department of Highways and its organized science, skill and funds with the township road.

By the act of July 22, 1913, a suzerainty over the township supervisors by the Department of Highways, which makes the direct connections referred to above, and reenacts the act of April 12, 1905, with such modifications and amplifications as establish a workability between the State and township authorities was authorized. To some of the provisions of this act exceptions might be taken by those disposed to be critical. Your Committee is not so disposed, because it establishes the principle of unity of purpose, action and forces between all the road authorities and powers of the State, and provides the legal machinery, under centralized and intelligent control, your Committee ignores its defects—which may be many but are remediable by amendatory legislation—and gives it full commendation. As a matter of fact the act has already been amended as to sections 5, 9 and 15, by the present legislature.

Your Committee is not unaware that this view of the interrelation of State and local authorities and laws is diametrically contravened by some of our thoughtful citizens; and it acknowledges with very high appreciation the receipt of letters from a prominent citizen and distinguished lawyer in the southwestern part of the State, whose opinions upon the subject are the more particularly entitled to the highest respect because he has his country home in a township in which there are nearly 200 miles of township roads, who strongly inclines to this opposing view. Notwithstanding this, your Committee believes that a half century of constant use and close observance of the country road, with no inconsiderable effort toward the solution of the economic and practical questions involved, added to a more or less studious attitude toward the annual and biennial output of legislation relating thereto, justifies it in the conception above expressed.

In conclusion, Pennsylvania roads constitute the biggest proposition the State has on hand, from whatever point of view may be taken, requiring tremendous outlays of labor, money, time and patience for its accomplishment, and the one thing for everybody concerned to do is push, not kick.

The CHAIRMAN: Gentlemen, you have heard the report; what is your pleasure?

MR. BLYHOLDER: I move that the report be received and spread on the records.

The CHAIRMAN: Perhaps it is in order to discuss this topic. I think it is very important. We have ten or fifteen minutes for discussion and I would be glad to hear from any member.

MR. KILLAM: It seems to me that we can add nothing to the report and we certainly should not try to detract anything from it. It is the most even thing I have yet heard in the line of road reports, and I think the best thing is for the people to take that report after it is completed and study it and form their conclusions alone. If you want to stir up a hornet's nest, holler "Roads;" that's all you've got to do before this Board. I consider it a very able report, it is a report that has taken a great deal of time and study and I think we are very fortunate in having Col. Woodward on that Committee.

MR. DeWITT: I was very much pleased with the report. I think that is the best road report that we, as a State Board of Agriculture, ever had, but I am not wholly in sympathy with what Brother Killam has said; we are here from all quarters of this great Commonwealth, and I think that if we have not been properly treated with respect to the roads, that it is up to us to express ourselves. One thing that confronts me is the fact, if I am properly informed, that 60% or 60 cents out of every dollar that is appropriated for the roads never gets to the roads—only 40% gets to the roads and 60% is used before it gets to the roads. If I am properly informed, the Highway Department had a representative controlling two counties, as a rule; but in the last season that has been revised by putting a highway man in each county. That only adds to the expense, taking the money that belongs on the roads, and I don't know that those men were worked so hard that they could not attend to their official duties in the two counties. That money should never have been spent, in my judgment, in that direction, it should have been put upon the roads, where it belongs. We, as tax-payers, are entitled to these roads, and if we do not get them, we are privileged to kick, in my judgment, or express ourselves, at the least.

A little transaction in regard to the roads occurred in our county, Tioga. We have a connecting road coming in from Lycoming county, in this direction, and going through into New York State. A section of road there of about 10 miles was in ridiculous shape all summer, until towards fall. I don't know that our man over there was worked so hard that he could not see this road or fix it, or whether there wasn't money, as he reported, to repair it, but such things, when the money is appropriated, as a main thoroughfare like that is should be kept in repair so that the people can use it; it was worse than a majority of our dirt roads. Another thing that occurred in our district there, the floods in the summer took out a small bridge along in July, forcing the people who lived up this creek or ravine, one of our best farming sections of the country up through the eastern part of the county, the people were forced to go through that creek or over a temporary bridge up to the present time, all for the want of a report or a privilege to put in a bridge, owing to the fact that they could not get what they called a water commission to come there and tell them just how to locate that bridge. Now the people suffered that inconvenience and many inconveniences have been suffered in our county and in our neck of the woods that a great many of us people think that we are justified in saying some things some times that would not be proper to say in Sunday-school.

Now, gentlemen, I like the report, I am glad that we dare say what Col. Woodward has said, and I hope that the people who are here from all over this State, representing each county, will express themselves to the extent of how they are treated in their own individual counties.

The CHAIRMAN: Are there any further remarks?

MR. KILLAM: If we are going to criticise, I'd go for the State Highway people and complain there about this road business; this is a mere discussion of Col. Woodward's report.

The CHAIRMAN: There is a motion before the Board to place this report on the minutes as read.

The motion was seconded and adopted.

The CHAIRMAN: Our next topic is "Fruit and Fruit Culture," E. A. Studholme, Chairman.

Mr. Studholme then presented the following report:

REPORT OF COMMITTEE ON FRUIT AND FRUIT CULTURE

By E. A. STUDHOLME, *Chairman.*

The year 1915 has been a very profitable one to the fruit growers in some sections of the State, while in other sections the fruit crop was almost a total failure. Reports from some counties show that the heavy frosts of May 26, 27 and 28 killed practically all the fruit, while in the other counties that escaped the late frost the yield was good. This is especially true in regards to the peach crop. Fortunately the counties where most of the peaches are grown in this State did not suffer from the frost and the yield in these counties was very large.

This condition in the State brought very forcibly to our attention the need of better facilities in marketing our crops. In some sections the peach crop was left to rot on the ground, while in other sections they were commanding a high price. This is one of the big problems confronting the fruit grower.

It has been often stated that if we were to eliminate the middleman, the problem of getting our produce to the consumer, with the least amount of loss to both parties, would be solved. In some cases no doubt this is true, but we must have some method of distribution and where the middleman performs a service he is entitled to a fair compensation for that work. As in most lines of business we have the honest and the dishonest commission men; so have we the honest and dishonest fruit growers. The barrel of apples with the good ones on top and bottom, but with poor specimens in the middle is still with us, and as long as this condition exists we should not expect to have saints in the commission houses.

The greatest need to the fruit growing business in this State, at present, along legislative lines, is for a law compelling every shipper

to mark his name and address on every package he ships, with the grade and minimum size of the fruit contained in the package. This law is sure to come sooner or later in this State as it is already in operation in other states, and the right source from which it should come is from the fruit growers themselves.

The thousands of young trees coming into bearing will mean closer competition and the fruit grower who pays close attention to the grading and packing of his fruit will be the one to make a success of his business. Situated in the heart of the fruit growing section, with the best markets in the country for our products, there need be no fear of over production of the best quality of fruit in the State. To capture the markets for our own products, all we need is closer attention to the appearance of our package, as we already have the quality of fruit to put in the package.

The future of the fruit business is the same as the future of any other business, we will have good years and bad years, but the fruit grower who will pay close attention to his business, who will retain his enthusiasm in the years of low prices, using the best methods of producing and marketing his crops will surely make a success in the fruit business as he would in any other line of business.

It was moved and carried that Mr. Studholme's report be accepted and placed on record.

The CHAIRMAN: The next topic is the report of the Botanist, Prof. F. D. Kern, of State College. Prof. Kern presented the following report:

REPORT OF THE BOTANIST

By PROF. F. D. KERN, *State College, Pa.*

The chief problems of a botanical nature in which the members of this Board are interested are without much doubt the eradication of weeds and the control of plant diseases. The year 1915 did not develop any unusual situations regarding weeds. There was the usual correspondence from all parts of the State asking for identifications and suggestions as to methods of extermination. In the report a year ago the speaker referred to weeds and considerable interest was manifested in the subject. Perhaps it may be well to mention specifically some of the weeds which were inquired about most during the past year.

Yellow or Hop Clover was received for identification from numerous correspondents from ten or more counties. The scientific name is *Trifolium agrarium*. This is an annual plant which has been introduced from Europe. Its seeds are doubtless distributed as impurities through those of the larger clovers. It is a soil enricher as all the clovers are and can scarcely be called a weed, although one finds mention of it usually in that connection. Its bright yellow flowers are conspicuous and attract the attention of those not familiar with it. It is not new in the State, as mention of its occurrence may be found in the Report of the Botanist, Dr.

Buckhout, for 1903. It has been tried as a forage plant in some places, but apparently without much success, and since it usually is possible to employ larger and better forage plants there does not seem to be much of a future for it. On more sandy soils where there are no better clovers, there might be a possibility of using it to advantage. Where it is looked upon as a weed it can be controlled by preventing seed development through early and frequent cutting. Clover and grass seeds should be watched carefully as it is through them that such plants as this are distributed.

Yellow Melilot or Yellow Sweet Clover (*Melilotus officinalis*) also attracted attention and was sent in several times. It is very similar to the ordinary white form (*Melilotus alba*) except in color, but occurs more sparingly. There is also considerable question about classing either of these forms as weeds.

An interesting sample of a tough wiry grass was received through the office of Secretary Critchfield. It was without heads, but by comparison with a similar form on the campus at State College, it was finally determined as Sheep's Fescue, botanically known as *Festuca ovina*. It belongs to the same genus as Meadow Fescue which is commonly cultivated as a meadow and pasture grass. The Sheep's Fescue is said to be used in some places in this country in pasture mixtures for sterile soils, but from our observations, we would classify it as an undesirable form. It has a curious habit of growing in tufts and dying at the center as it spreads in all directions.

Numerous reports were received of an annual plant, which has been introduced from South America, known as *Galinsoga*. If it has any other common name I am not familiar with it. It is reported as troublesome especially in gardens. The stem grows up to one or two feet and is much branched. The heads are small, about one-quarter inch broad, and have yellow centers with white rays. Every effort should be made to prevent it from going to seed. It has a shallow root and is easily pulled. In cultivated ground it is usually not troublesome as it cannot stand the tillage given the crop.

From the point of view of plant diseases, the season was marked by one or two epidemics worthy of especial mention. Fire blight, or pear blight, on apples and pears was much more severe than usual. It is present and does some damage every year. The explanation of the unusual development this year is to be sought in the nature of the season. The cool, wet weather prolonged the growing season for the trees and the time during which the blight worked injury was much extended; in fact it was present nearly the whole season, whereas, it is usually checked by the maturing of the woody tissues about mid-season. Fire-blight was bad in the other apple growing states of the East and there is at present a movement looking toward a national conference on the subject to consider methods of control and investigation.

The potato crop was affected by diseases in a very serious way during the past season. In this connection a brief reference may be made to what is known as the *Rhizoctonia* disease of potatoes. Although the fungus causing the disease has been known in the State,

this is the first season, so far as the speaker is aware, that it has been recognized as a factor in the production of disease of economic importance. The fungus works several types of injury to the potato and the plant. The main type, and the one by which it is best known, is the "black speck" or "black speck scab" stage. These hard, black specks adhere to the tubers and appear like particles of soil; but are really made up of threads of the fungus which serve as a means of carrying it over winter. The fungus also causes a scabby or corky condition of the tubers, a rot of the tubers and roots and secondary effects known as little potato and aerial potato. Sufficient of these forms were observed to make it evident that this disease must be considered seriously. It is caused by a soil organism and without doubt climatic conditions have much to do with its development, although it is not known what factors favor the diverse forms which it assumes. General methods of control can scarcely be suggested at this time. The variety, character of the soil and climatic conditions, together with the different manifestations of disease make the problem a difficult one. If it is desired to disinfect the tubers, corrosive sublimate must be used since formaldehyde as used for common scab is not effective. Rotation of crops with as long a time as possible between crops of potatoes is desirable. It should be said also that it is not possible to state what the future of the disease may be with the variable nature of our weather conditions. The late blight caused by the fungus known as *Phytophthora infestans* destroyed perhaps one-half of the potato crop in 1915. Other epidemics are known to have occurred in 1910 and 1891. It is well known that the season was marked by excessive rainfall and unusually low temperatures. The amount of precipitation and atmospheric temperatures seem not to be sufficient to explain outbreaks of the late blight, and investigation has led Professor Orton, of State College, to the belief that low soil temperature combined with high relative humidity at the proper time, late July and August, are probably the most important factors favoring the development of the disease.

An unusual outbreak of late blight also occurred on the tomato, caused by the same fungus which affects the potato. It is not known how general this outbreak may have been but it was observed in the central part of the State and was prevalent especially on the College farm, where the crop was practically destroyed. In America the disease has been known to cause losses to tomatoes in California and Virginia and has been reported also from Maine, Connecticut and Massachusetts, but has not been reported previously in Pennsylvania. No record of varietal resistance was kept but all of the thirty-nine varieties grown in the experimental plats were affected to some extent and the crop was almost a total failure. The fungus attacks leaves, stems, and fruits with about equal virulence.

Apple rust was bad in the southeastern sections and is without doubt increasing in importance from year to year. The white pine blister rust is known to persist within the State. Inspections have shown that it has been imported into seven different plantations but the effectiveness of the attempts to eradicate it are unknown. Numerous other plant diseases might be mentioned, but time does not permit of their discussion.

The CHAIRMAN: If there is no objection, this report will be received and filed.

MR. J. ALDUS HERR: I would like to say something in reference to the discussion of this paper; part of the paper would include the different seeds on the farm. In reference to the botanical side of it, that is reference to the seeds and the difficulty of the average farmer has in getting pure seeds, there isn't anything that is so detrimental in our county, as we find it, and those most detrimental to us are Canada thistle, wild mustard and buckthorn. I can well recollect the time when all three of them were practically new to our county. At a meeting some weeks ago, at an agricultural meeting in my neighborhood, we took a vote in the meeting as to what percentage of the farms in the neighborhood were free from Canada thistle, and I actually believe, if the members would have told their convictions, that there was hardly a farm in the neighborhood that was not polluted at the present time with the pest. A year ago while buying my clover seed or when I bought it, I bought it on a guarantee to be practically free from obnoxious weeds. I sent the sample to Washington and had it analyzed. In the analysis of that sample there were 117 weeds to the square rod, if you please. Among them were three kinds of sisal seeds and two dodder seeds. Now I bought that in good faith and have no regrets. My neighbor bought some oats and he had a most beautiful crop of wild mustard. Now that is the side of the report that I would like to see discussed and know what remedy we have, for there isn't anything, in my judgment, on the farm that is so difficult to go up against as weed seed. It is not a question of price, but it is a question of getting what we want. I would like to hear this discussed a little.

MR. HUTCHISON: We are endeavoring in our Bureau to try and do the best we can under this new law, in the way of giving the farmers pure seed. The only trouble we find is that the standard that the Legislature enacted into this law is not high enough; it says 97%. I tried my very best to get 99 and then dropped to 98, but unfortunately there were some farmers on the Committee that opposed it, giving, as their reason, that it was impossible to produce that standard of seed on the Pennsylvania farms. Now we have been examining hundreds of samples of seed in the laboratories, and for the small sum of 25 cents you can have your seeds tested here in your own State by a chemist who has had experience and who has taken training in the Department of Agriculture at Washington and is doing splendid work. If Mr. Herr had brought that to our attention at the time, I believe that under our Act of Assembly, we might have been able to have brought prosecution if the evidence had been all right.

MR. J. ALDUS HERR: I have that report at home or know where I can get it. I gave it to our Association. It was signed by the Government and I know where the seed was purchased.

MR. HUTCHISON: Was it purchased in our State?

MR. J. ALDUS HERR: That I cannot tell you now, but I can find out as soon as I go home where it was purchased, or rather through whom it was purchased.

MR. HUTCHISON: A few prosecutions brought against an offender like that would have a good effect in the Commonwealth to-day. I find that the men who are dealing in seeds and shipping into our State are very anxious to comply with our law. Our law allows one Canada thistle seed in 3,000 to exist. I never could see why that was put in the law, but it is there. There is no worse curse on the farms of Pennsylvania today, and especially on the limestone farms, than Canada thistle; it seems to love limestone. It will stay on good soil; I don't believe they are troubled with it on thin soil nearly as much. We are here to try to help you and aid you farmers in enforcing this law, but I am going to make a recommendation tomorrow that you try and have the next Legislature increase the standard at least to 98% of purity. Now these states outside that come in, these shippers in those states will mark their's 99 in your county, in Lancaster, and others where there are large seed stores, and it is a great subject. If you don't have good seeds, you cannot raise good clover, good alfalfa and good crops. It is the same as raising a crop of anything, you must plant good seed if you want good men to grow and good women; in this Commonwealth we have got to have good teachers and good instructors and lay good foundations. I am glad to hear this discussion and I hope next year when we go after it we will be able to bring about a reform of this kind.

At this point Governor Brumbaugh entered and was received with applause, and a recess of five minutes was taken to allow the members of the Board to shake hands with him.

The **CHAIRMAN:** At this time I am going to call on Brother Hutchison to say something in regard to our Society.

MR. HUTCHISON: Mr. President, your Excellency the Governor and the Secretary of Agriculture: Just a moment ago, your President came to me and said, "George, can't you say something about who we are and what we are and what we are doing?" I replied, "That would be a great pleasure, if I had time to go back and find out all about us;" but I picked up the law here under which we are working, and I find that the Board of Agriculture was created in 1876, the Centennial year, and that this Board was brought into existence on the eighth day of May. At that time there was no agricultural society in the State—I believe there was one, an old farm association, but the thought and the demand that had been made on the people of Pennsylvania—it came into the minds of some of our forefathers that they should establish some agricultural organization, and this Board was established and I know there's a gentleman here that can give a better history than I can, because he is one of the original members; and that is Col Woodward; am I right?

COL. WOODWARD: No sir, John Hamilton, either John Hamilton or Dr. Hale.

MR. HUTCHISON: Dr. Hale, of Bedford, who owned at that time a large number of farms in Centre and Mifflin counties. This is the class of men, Col. Woodward, Thomas J. Edge, who laid the

foundation for agricultural education, and that great man of Washington county who was a large sheep grower, who raised the sheep that grew the wool, that made the suit for President McKinley to be inaugurated in—Mr. MacDowall. These are some of the men who started this organization. Now, your Honor, the Governor, the men of this organization are men who come from each county, elected by the old agricultural societies in the counties, which send up these representatives here and have held together for these many, many years. They have held the farmers' institutes throughout the different counties; they have spent their time taking eight, ten or twelve days each year without money and without price, going up and down in their way teaching agriculture, helping lay the foundation for the many great organizations that have come into existence since that time. They are here today from the different counties to welcome you, to look into your face and you into theirs, and see what manner of men they are. They come from all walks of life. We have here with us today the doctor who is a busy man and lays aside his work, who owns farms and goes out and tries to help his neighbor; and then we have the active farmer, the men who have left their work at home and come here to spend this time and to go home and go out and teach agriculture. They represent the parent society; from this society has sprung the different societies, the horticultural society and the dairymen's union and all other kindred societies, and they are the men who have stood back of the Department of Agriculture in its organization and have stood back of State College in its work and taken its message out and taken its professors and teachers out throughout the Commonwealth so that they might bring their story to the people, and we are here today to meet you and greet you and are glad that you came from the farm. I had the honor of knowing you in the hills of Huntingdon county where your farms are located and where you have stood with father and mother on the farm and know the trials and tribulations we have and which these men have to meet, and the problems they have to meet. I want to welcome you here today in their behalf and say to you that we are with you in all good work for the betterment not only of the farm, but of the people of this Commonwealth, and may God speed you in your undertaking.

ADDRESS OF GOVERNOR BRUMBAUGH

Mr. Chairman and Gentlemen: I had the pleasure a year ago, at the meeting of your body, to speak briefly to you down in the other part of the city. We have now passed through one year of our work and are up here on the Hill and it is a peculiar source of pleasure and of gratitude to me that we can meet under the peaceful and satisfactory auspices that surround us here this beautiful morning in our Capitol Building. You gather from all parts of Pennsylvania; each of you knows in a very intimate way some one section of this great imperial Commonwealth, and if in some way we could build together what each one knows and make out of it a composite picture representing what all of us know, there would arise in our souls a picture of the finest Commonwealth that God ever set in the world. That is your heritage and mine, and it is a source of gratitude just to be born and to live in as fine a state as Pennsylvania, and I should like, this morning, first of all,

to impress upon you the fact that Pennsylvania is a fine, splendid place in which to live, in which to rear your children and in which to perform your daily duties. Don't get into your soul the thought that by migrating elsewhere you could largely improve your conditions. It is incumbent upon you and incumbent upon me to make the conditions here in Pennsylvania so fine that we will all be glad to stay and to welcome others to help build up our great Commonwealth. (Applause) It may be known to you, I think it ought to be, that during this year it has been my conscientious endeavor to try to improve the agricultural conditions of Pennsylvania because her soil is her permanent and splendid asset; not what is under it, but what it itself is and that which springs from it under the care and cultivation of wise and prudent men in Pennsylvania. Now anything that we can do, as a people, in our organized and official capacity, we ought to do to increase the returns, the rewards of industry upon the soil of Pennsylvania. Substantially 11% of all our people are farmers, are engaged in this occupation of producing food for the other part of our population. The number is too small and there should be an increase in the number of people who cultivate the soil of Pennsylvania.

That is a serious matter to which you have turned in one way or another probably during all the years with which you have had to do officially with that problem. So long as we buy food in large quantities from outside the Commonwealth, so long as our people are dependent upon foreign markets for the food to sustain them in their daily toil, we are not working Pennsylvania to its maximum service to itself, so that anything that we can do that would improve that condition ought to commend itself in a very definite and in a very practical way to all of us.

Just in a word. I was convinced a year ago and I still entertain the thought that if we can put good roads to the farms of Pennsylvania so that it will be easy to transport the crops to the market, that within itself is an important service, and I submit to you, conversant as you are with the several neighborhoods of the State, that we have actually done something in that direction and we shall do more as the years go by. We have also had passed and put into operation a new law, in a way, re-organizing the Department of Agriculture here at the Capitol, and I have the very great satisfaction of my soul to say that we have put at the head of that department a most capable, a most conscientious, and splendid man, Mr. Patton, (applause) who is not only interested in everything that makes for better farm conditions in your Commonwealth, but who has the judgment, the insight, the executive capacity to help you in definite ways to that end.

Now, further than that, there is a matter which I think none of you have as yet sensed. We have put in operation here in Pennsylvania a Workmen's Compensation Law, which, by a special act of Assembly, excludes—I mean, a child labor law—which excludes farm labor and domestic service from its provisions just as the Workmen's Compensation Law does. I wonder if you have thought what that means, whether you have analyzed the far-reaching purpose bedded deep in that child labor provision? It is a definite attempt on the part of the Executive and his friends and the friends of the

childhood of the State to make it easy for boys to stay on the farm and in the home, where they ought to be, instead of flocking to the industries at a premature age to try to earn a small pittance which fixes them as cheap toilers all their lives in our villages and manufacturing centers. You will know more of that as the years go by and see the wisdom in the operation of that law.

Now I am interested also in another phase of this problem which your Board of Agriculture and your Commissioner of Agriculture will be working out with your co-operation and help, I trust, during the coming year. It is not enough to grow your crops, we have got to see that these crops find a ready and a good market and the marketing facilities for the farm crops of Pennsylvania are so very much below what they ought to be, that every man in this State who is interested in it's welfare ought to give serious support to a movement that will increase the marketing conditions and facilities of Pennsylvania. (Applause.) We ought to make a complete survey of our soil and advise our people in a definite way as to the method of treating it and caring for it and securing from it its maximum return for the efforts put upon it.

There is another matter in which I am deeply interested. I believe that this Department of Agriculture should have, and I think in the near future it will have, an expert man or woman who will be able to go to a farmer who sends for him just with a postal card, and, without cost to the farmer, advise him upon everything in which he is concerned for the betterment of his family and his property in Pennsylvania.

Now, having in mind at least three things in that which have all come to my attention because of my study of the State in recent years, first of all, to see to it that the drainage from our barns does not reach the source of water that our families consume. Now, that may seem a small matter to you, and yet there are farms in this State today whose buildings are so located that the menace from typhoid fever is an increasing one by reason of the improper location of the buildings, and it is infinitely better, gentlemen, that the Commonwealth should have a pound of prevention rather than a ton of cure in matters of health and the preservation of human life.

Now the second thing would be to work out the problem on that farm of reducing the effort of performing the farm duties to a minimum. I know farms in Pennsylvania where the women and children and indeed the farmer himself, are practically worn out at the end of the day because they have to walk three or four times as far as necessary to perform the duties around the buildings morning and evening. The thought of that! Economy in steps means economy in energy, in strength, and therefore increased efficiency on the farm. And then I should like also to have some attention paid to the setting of a man's farm property so that when he wants to sell his property, it will appeal to the purchaser not only as a desirable thing from the point of view of its productiveness and from its accessibility, but from the point of view of its appearance to himself and to his friends as they travel to and fro before it. Some of our beautiful farm buildings in this State are sources of great pride to us, and some of them are so forbidding and ugly and unsanitary that it is a positive shame to look upon them or to note that they exist in this great Commonwealth. (Applause.) Nobody

is to blame for that condition; it is an inherited thing, something that we have gone on and done and done and done, each man in his own way, by the best light that he possesses. The Commonwealth ought to come in there and without one cent of expense to the farmer give him scientific guidance in producing maximum satisfaction in the treatment of his farm buildings and farm property. If we can do that, we will have done something worth while.

Finally, because I must not trespass upon your time, I have in mind another thing I want to lay before you. Last year, after four months of rather earnest effort on the part of the Highway Department putting our roads in condition that was at least as satisfactory as the money at our command would permit, we organized a thousand mile tour in Pennsylvania to see our highways, and we actually carried people on that tour who did not believe that Pennsylvania had that many miles of good roads, and we had to, mile by mile, work that thought into their systems until it became a fixed and demonstrated fact that it was true. The truth about the matter is, that next to the State of New York, Pennsylvania has the largest mileage of good roads of any state in this Union and she has built them without a dollar of bonded indebtedness upon the Commonwealth. (Applause.) Now we are going to increase that amount of mileage and we are trying, with all the energy and skill and honesty that we possess, to make the money of the people count in the road problem.

Now what would you think and how would it appeal to you good people if, next Autumn, instead of going out on a road observation tour, some of us would organize a party and come out and see what kind of apples you have grown in Pennsylvania? (Applause.) What kind of pigs you have got on your farms in Pennsylvania, and what kind of corn you are growing in Pennsylvania, and what kind of babies you are rearing in your homes? (Applause.) And bring the whole administrative side of your Commonwealth service into sympathetic touch with the man on the farm, who is the prince of Pennsylvania, who is actually making good, in a modest way, on a little bit of God's green earth. I'd like to see that man; wouldn't you? And I believe that a plan of that sort, properly worked out, would call the attention of our whole population to our farm conditions in Pennsylvania, would result in all the necessary remedial legislation that we have a right to seek, and start this work under Secretary Patton and the new Commission on a road of development and of progress and of health to the farmers of Pennsylvania in a way better than any other that I can conceive of. If you know of a better thing to do, if you think of a better plan, let us have it, we want it.

Now, finally, therefore, this being all, sums itself up into the one thought in my soul. I want the service of the Commonwealth, for which I am in a large measure responsible, to make good on the soil of Pennsylvania, to count in the increase of the crops of the farmers of Pennsylvania, to count in the cheapening of the cost of food in the congested centers of our population, and to bring about such a co-operation and sympathy between the rural and the urban populations of the Commonwealth that every thing that counts for the good of one shall count for the betterment of the other; that we shall build up here in Pennsylvania a solidarity of population and a sympathy and co-operation that will make all of us increasingly proud of the

grand old Commonwealth that God has put in our hands to care for. Thank you very kindly for your courtesy this morning. (Applause.)

The CHAIRMAN: Gentlemen, I am sure you all want to hear from your new Secretary and I take great pleasure in introducing Secretary Patton. (Applause.)

SECRETARY PATTON: I did not expect to say anything at this time, but I do want to meet with you and go over some matters. As the Governor says, he expects to do great things, and as I am the executive of the Department, I suppose he will expect of me the fulfillment of that promise to you. I was listening while Mr. Hutchison was talking, and it seems that the Department of Agriculture is the creature of this body. If I know the history right, the Secretary of the State Board of Agriculture, was given office here and from that the Department of Agriculture started. Is that right?

A Member: That is correct.

SECRETARY PATTON: So that I am your child and I am here to try to do the best I can for the State of Pennsylvania and its agricultural interests. I want the help of every one of you. I want you to feel free to come to me at any time and discuss matters you think you ought to. If there are any kicks, come to me, I want to know them first, I don't want you to be giving them out to somebody outside. If you hear of any dissatisfaction, I will be glad to hear of it, and if there is any way to correct it, we will correct it, or try to, at least.

There are some things we cannot do and I do not think we will be expected to do impossibilities; but I have talked with the Governor about this trip over the State and I am very anxious to have that accomplished, and I would like you gentlemen today to suggest what you think would be the best time for us to make that trip. My idea has been along about the last of August, about harvest time, when the apple trees, the fruit trees, are at their best. I wish, during the meeting sometime, that you would discuss that and let us know about what time you consider best. Our idea was to make a three weeks' trip of it, taking three days each week, start out for three days in one week and then go three days the next week, and the next week three days, taking different routes and getting new people interested each time, getting the town people out in the country to see what the farmers are doing and getting the farmers acquainted with the town people. I believe that is all I have to say at this time. (Applause.)

The CHAIRMAN: Our next topic for discussion is the report of the Pomologist, Mr. Chester J. Tyson.

MR. TYSON: I wish to say, that following our practice of the last few years, it has not seemed wise to undertake to cover the whole subject or even the whole business side of apple growing, but to take one or two special points that may be made before you and which, by their emphasis, may be given some particular value.

Mr. Tyson then submitted the following report:

REPORT OF POMOLOGIST FOR 1915

By CHESTER J. TYSON

Your Pomologist is again confronted with the problem of making a report that will be of some value to the Board, at the same time coming within the scope of his observation and knowledge. There has been neither provision nor opportunity for extended survey or research, and this raises the question whether a purely scientific Pomologist, with research material at hand, might not better serve the Board than a plain apple grower can do. The report of the apple grower is bound to review the business rather than the science of Pomology. Moreover, the commercial apple grower finds it nearly impossible to confine his observations to conditions in Pennsylvania alone. The subject is so broad and the scope of the business is so far reaching, that state lines cannot bound it. So closely are the interests of the different sections interwoven, and so generally are the same large markets used by all, that general consideration of country-wide conditions seems wise and most likely to bear fruit. The 1915 crop was a hard one to estimate in advance and nearly as hard to review. Several influences have contributed to bring about these results.

As noted in former reports to this Board, there has been a widespread epidemic of apple planting, beginning nearly fifteen years ago, reaching its height 4 years ago, and decreasing to the present time. Millions of trees have been planted, most of them in rather well defined and long established apple sections, but in many cases entirely new orchard sections have been developed to a really tremendous degree, notably some of the mountain districts of southern Pennsylvania, western Maryland and West Virginia. Still other plantings, some of them really very large and aggregating numbers almost beyond conception, have been located here and there throughout the whole country, including Canada. These new orchards are beginning to bear in such numbers that no crop estimate is of any value unless it figures them as a considerable part of the whole and none of the crop estimating machinery now in use seems to be equipped to consider these outlying, heretofore unreported sections at all.

Local Spring frosts put some sections entirely out of business, giving the impression of a crop failure, while only a few miles away there may have been no frost and a heavy crop resulting.

Pear blight, on apple, particularly the blossom form, was more prevalent than usual, in many cases actually destroying the crop; while in other cases the only result was to thin the setting of fruit and leave plenty for an abundant crop. General report, however, pronounced a crop failure throughout the whole southern section where blight was common this year.

A still further difficulty encountered in crop estimating, is the feeling on the part of many growers, fostered by various organizations and publications, as well as by some public officials, that it will be to their advantage to have the crop underestimated, thus making it most difficult to get a true report from the very people

who are best able to give the facts. This is a form of dishonesty that is hard to understand, for in the end it deceives no one quite so much as the growers who practice it. Further development of this report will perhaps make this point clear.

Various estimates of growers' associations, apple dealers' organizations and the Division of Markets of the United States Department of Agriculture, placed the 1915 crop at from 60% to 80% of the 1914 crop which was a very large one. Stress was laid on the improved industrial condition of the country.

Now, apple buyers as a class, have a peculiar characteristic. Contrary to the common belief, they are easily deceived in the matter of an apple crop, for they want to believe that good prices are ahead and lend willing ears to just such reports as were common the past season. This was the result. Apple buyers were active, competition among them was keen and in the end all the apples that could be bought in the large commercial sections were put under contract at from \$2.50 to \$3.00 per barrel f. o. b. for the No. 1 fruit. Now, there was no market in the whole country that would warrant these prices during the months of harvesting, but the dealers felt that the future was safe, with this result: On January 1, the storage houses of the country contained nearly one hundred thousand barrels more apples than at the same date one year ago, bought or held at prices that no market has been willing to pay up to this time. Apples have been held for higher prices with the hope of coming out whole. Consumption, quickly affected by advancing prices, has been curtailed, and most dealers have now given up all hope of avoiding a loss. The trade in general—will come up to the next buying season feeling that the growers owe them something which they will proceed to take if they can. Growers who did not sell at harvest times are of course meeting the same market conditions as the men who invested in fruits, and like them, are now suffering the result of under-estimating and over-valuing the crop.

Conditions are changing in the marketing of apples, as in most other lines of commerce. Comparatively few years have passed since it was unusual to keep apples through the winter under refrigeration. The value of a barrel of apples at harvest time in those days was the price it would net if shipped to market and sold. There was no speculative buying, consequently no need of crop estimates. Today nearly all winter apples are either sold to a dealer who speculates on future values, or held by the grower in case his estimate of future worth is higher than the price he is offered at shipping time. This makes it exceedingly important to have at hand the best available information as to the quantity and quality of the crop to be marketed, and the business condition of the country that is later expected to buy and consume the fruit.

I have developed these details with the hope of emphasizing the importance and value of a real crop estimate, and the dangers that accompany under as well as over estimating. From time to time you will be called upon to contribute to the information on which these estimates are based. I would urge that you make your reports as nearly as you can in accordance with the facts and that you bear in mind, always, the ever increasing number of new orchards just beginning to bear.

Perhaps we cannot use our remaining few moments to better advantage than by calling attention to the great changes that are being made in the harvesting and packing of the apple crop. Not many years ago, and most of you will remember it, the common practice was to pick the apples in great piles in the orchard, piling them on straw to keep them clean and usually covering the apples with corn fodder to prevent sun scalding.

Next followed the practice of pouring the apples direct from the trees on packing tables and running them into barrels ready for market. This was a great improvement over the former plan for it made less work; it avoided ripening and decay and it put the apples into the barrels clean and fresh as they came from the tree. Still greater changes are now taking place, and each year more and more of the larger growers are building packing houses and are bringing all of their apples together under one roof for the purpose of grading and packing. They find that, including the cost of hauling, they can do much cheaper packing, and can do far better work than ever was possible in the orchard. This change has also opened up the possibility of mechanical grading, and not a few growers have installed machines to accurately assort their apples into several uniform sizes for packing.

While being neither a prophet nor the son of a prophet, your Pomologist does register his guess that ten years from now, perhaps much less, will see apples as generally and as carefully sized as we now see practiced with oranges. The buying public will demand it and it will pay to meet the demand.

The CHAIRMAN: Are there any remarks?

MR. FENSTERMACHER: This report is excellent. Our trouble is on the consumption, apples being locked up and not for sale held until the prices expected to go up. The New York State law has acted against us too, in our section of Pennsylvania. While it prevents them from putting up their stove-pipe barrels, putting trash into barrels and labeling them No. 1 apples, it does not prevent them from loading them in bulk and bringing them by the carload into our markets, and today pretty fair Baldwin apples sell at \$2.00 and \$2.50 a barrel in the City of Allentown, and that applies to Lancaster and other towns in the State. They are taking the place of our good apples, they are being dumped into the State wholesale and that reacts against our interests, I think, but all the same, the under-consumption of apples is the main factor; there is no doubt about it. With all the increase in population, the consumption of apples has not kept pace with the banana and orange and other things which are growing cheaper—and grapes—and are taking the place of the apple. Either we have not advertised apples enough or they have been too high; for sometime people have got out of the habit of eating apples, it seems to me, in certain respects, and unless you begin to bring to the attention of the consumer that the apple is the best and healthiest fruit grown under God's sun, we will simply have the same condition and even worse when all our young orchards get into bearing.

MR. J. ALDUS HERR: I wish to say one thing with reference to the apples of Lancaster. Lancaster has quite a good market, at least we think so, and not more than a few days ago you could find plenty of inferior or medium sized apples; but strictly good, first-class apples were selling at 25 and 30 cents a half peck and you didn't see many on the market. Now the price is just a little too high for the average consumer; but you can find a good many apples in storage that were brought there in carloads, bulk, but you don't find many good, first-class apples, and I think it is because the price is absolutely prohibitive to the average person that can buy them.

MR. HUTCHISON: What is the price?

MR. J. ALDUS HERR: Twenty-five or thirty cents a half peck. The others sell for fifteen cents a peck.

MR. DE WITT: A friend of mine from New York three or four years ago was visiting my house, he and his wife, and we had some apples on the table and she said "Mr. DeWitt, it does me good to get hold of a good apple to eat. We live in New York City;" and her husband is connected with the transportation company there and holds a very lucrative and responsible position and knows a great deal about the shipping that comes there by boat. She said "We can hardly get a good apple in New York City, and if we do, we have to pay an exorbitant price for it." I asked, "What do you pay?" She replied "We give 25 cents for two quarts." That fall apples sold from this section or from Pennsylvania, in different places, for only \$2.50 or \$3.00 a barrel. I said, "What is the occasion of this?" Her husband spoke up and he said: "You'd readily know the occasion why we pay this, when there are barges of apples that are run way out into the ocean and dumped—good apples." "Merchantable apples?" I asked. "Yes sir, merchantable apples, good apples," he replied. "What is that done for?" He replied, "It is to make us fellows pay 25 cents for 2 quarts of apples." Now you people that grow apples want to get after some of these fellows that will perpetrate such a trick upon the trade as to take fruit, because they cannot get the price that they want to get, or because they want to maintain a certain price, take it away out in the ocean and dump it when there are thousands of poor boys and girls and families that would like a good apple.

MR. HUTCHISON: We have Brother Creasy and Brother Runk here, representing agricultural interests; we would like to hear from them.

MR. CREASY: I have a somewhat different idea; I think one thing that has hurt our apple trade more than anything else is the bushel box of fancy packed apples, and some of my friends I think paid \$8. or \$9. a box for them. The average man wants just as good a thing as the other fellow has. He cannot buy these apples and pay \$2. or \$2.50 a box for them and he can buy the very cheap apples my friend is talking about that have been dumped on the market, but the average good apple that is the apple he ought to buy, it seems we don't fix it so that he can get hold of it. We formerly had the apple

barrel, we bought apples in our country years ago at \$5. to \$7. a barrel, but that day has gone by because most of our people cannot keep a barrel of apples long enough.

Now I think we want a different receptacle or measure to sell apples in. We don't want the apple box, we don't want to fool around half an hour to pack a bushel of apples; they must be uniform in size, but I believe if we had some kind of a bushel measure that could be packed quick and were all good apples, not necessarily all of one size, the man could pick out of that bushel just as nice apples as out of a box—not all, of course. Those apples ought to be sold at a reasonable price. The first thing I think is wrong is that we don't talk apples enough, we don't advertise the apple as we ought to, the benefit and the healthfulness of having apples. These other fruits come in the market and are taking the place of apples to a great extent just because we don't try to sell them as the consumer wants to buy them. I believe it is possible to have a measure or some kind of a box that holds about a bushel that can be picked quickly, that will look neat and be within reach of the ordinary consumer, and then we have got to get some system about selling these things and have some uniformity about the package so that the fruit is good. Those are some of the things I think we could look up, but I believe the apple box really has hurt our apple market more than it has done good, because when you pick a barrel of apples and put it into those boxes, you are spoiling the market for the barrel of apples and the ordinary fellow wants just as good a thing as the other fellow, but he can't afford to pay the price.

MR. HUTCHISON: We would like to hear from Mr. Runk, Secretary of the State Horticultural Society.

MR. RUNK: I am not Secretary of the State Horticultural Association any longer. I am one of those prospective producers that Mr. Tyson told you about. I have invested what little money I have in commercial apple growing and have come to a conclusion on some of the matters that have been presented. One thing that has hurt the retail apple trade seriously, friends, and that you people ought to be able to correct, is this inimical law that fixes the weight of a bushel of apples at fifty pounds. It has enabled a lot of dealers to buy apples at the enforced weight of fifty pounds to the bushel and retail them as they choose. Pennsylvania growers ought to have a cubical content measure as our standard bushel; cubical contents ought to pass apples of the grade Mr. Creasy was just speaking about. I think that law ought to be repealed. I know the weight was cut down to 45 pounds, but yesterday I shipped a standard bushel of apples that contained more than a bushel of carefully hand picked apples and it weighed less than forty pounds, and if I had not marked the cubical contents, I would have been liable under the law and that is an unjust proposition.

I am in sympathy with what Mr. Fenstermacher said, because right in the town of Huntingdon there are two dealers buying carload lots of these inferior culls, New York apples, and selling them to the trade, not as what they are, but as apples, and the only kind, they maintain, they can get; consequently they force the farmer to hawk them around on the street in competition with the price they can fix, and

they get those cull apples very cheaply. We must pass a law in Pennsylvania to determine the standard grades of Pennsylvania apples. I think our Pennsylvania Horticultural Association is pledged to work for some kind of legislation like that, and this year I think you people ought to go on record for the same if you are interested in apple growing, and perhaps we will pass a law excluding those cull New York apples. I don't know whether you can do that or not. I am in sympathy with the man who says we are producing all the apples we should produce, or the best apples. A large part of the dissatisfaction with reference to the local retailing of apples is caused by the very inferior grade of apples which the ordinary fruit grower produces and sells on the market, and for a poor price, of course, and consequently when we got into competition with that kind of apples with good apples, the good apples don't get the credit they ought to have. If I might, as a young man, contradict what Farmer Creasy has to say, I believe there is a place for boxed apples but it is not to the exclusion of the other grades of apples. There is a market, a city market for boxed apples, but boxed apples ought never to be thrown into the great industrial centers where the poor people buy apples, neither ought their price to conflict with that of well picked apples. Every fruit grower's association must get together; we need better co-operation, we need a little bit of organization that will enable apple growers to put their own product on the market. There is a man here that has done a whole lot better work than I have done and more of it and has worked along our line as a member of our Board. I would like to hear from Mr. Smith, of Lewistown.

MR. SMITH: As I am a young man just starting in this line of work, I do not think you can look for very much from me. In regard to Mr. Creasy's opinion of a different pack—I saw a pack that I believe comes up to the requirements; it is a cartoon; there's four layers of apples put in, twenty-five apples to the layer, so that it contains 100 apples to a box. They are put in layers the same as egg crates, with divisions. These apples are run over a grader and they run two and a half to two and three quarters and three inches in diameter. These cartoons cost about 14 cents, where the apple box cost 17, and they can be labeled 100 apples two and three-quarters or three inches and you get away from the weight question in that way. It makes a very nice, neat pack and I would think it is the very pack we are all after. It is the one that pleased me most of any I have ever seen.

MR. STOUT: I am interested in this discussion because I am not so young as some of you, but I have been at it a good many years. We have a market in the coal regions for a great deal of fruit, and sometimes the market is glutted with this same kind of fruit we have been speaking of that is brought in in carload lots. I ordered some of these boxes from a firm in Adams county and packed some of them to sell in competition with the western boxed apples, and the apples I packed were just as nice as they grow anywhere. I sold my apples for \$1.25 a box, and the western apples, they pay \$2. to \$3. a box for apples not any better. The other day I was in Pottsville and spoke to one of my customers. He had some nice apples all wrapped separate; I says "I suppose you sell those two for five cents?" He says

"No, I get five cents apiece for those." There seems to be a sort of infatuation among people to spend five cents; its five cents for the moving pictures and five cents for fancy apples. I sold my apples for sixty cents a bushel.

MR. TYSON: Two or three speakers have touched on what seems to be the real difficulty in marketing apples, that is the cost of getting apples to the consumer, and one of the largest items in that cost is the overhead expense of the little broker who is selling these two-quart lots of apples. If the consumers in our towns and cities could equip themselves so as to use a box or barrel of apples, the difficulty would be largely taken care of; the prices that really do result in curtailing our consumption would be changed entirely by that process. I don't know that it is a thing we can ever hope for, because the method of living in the city, in flats and the way modern houses are built does not take into consideration keeping a barrel of apples or a bushel of potatoes, but if such results could be brought about, the largest item in the cost of delivering products from the farm to the consumer would be taken care of.

PROF. SURFACE: There is where the advantage of such a package as Mr. Creasy has mentioned comes in. For the past two years we have used what is known as the Michigan Split Bushel Baskets, packing apples in them at the orchard and sending them to storage and selling them from there, and it has proven very satisfactory, compared with the few families who would buy a barrel at a time as the unit of their buying. The grocer must buy the barrel and break it into smaller quantities and retail them, and necessarily he will charge for that, and in the use of the smaller package like the bushel basket we have the solution of the problem of the householder who perhaps does not have a cellar in which to keep fruit. He will buy a bushel at a time and keep them till used, but he can scarcely buy a barrel. The fancy box package seems to scare off the ordinary consumer who has to buy for an ordinary price and uses a considerable amount. I think from my experience and observation, that they will buy the bushel basket not laid in a fancy manner sooner than they will buy the bushel box, and of course they can buy them cheaper because such a basket can be packed in one-tenth the time and sold for less than we can pack a box, but what we need in this State more than anything else is certain kinds of legislation favorable to the fruit grower. We need legislation that will make it possible to have our fruit more easily handled but less roughly handled by the transportation company. We need something that will make it possible to grade and mark our fruit according to the grade of the package, that will show us just what is there and not something else. I have tried hard to get some such legislation. We want legislation regulating the commission men. They came from the city to the capital here and defeated the legislation to regulate them; the farmers and fruit growers did not come up or they might have had it. The grape growers of Erie county, small as they are, got a law in this Legislature exempting their grape packages from the necessity of marking, but did not exempt any other kind, just because they got together and knew what they wanted and requested it, so the three forms of grape baskets do not have to be marked when the material is sold in them,

but all other fruits have to be. We can have laws by which we can sell a bushel for a bushel instead of selling 54 pounds of apples and all that sort of thing, but it is for the farmers and fruit growers to get them.

The CHAIRMAN: Our time is getting somewhat limited, and if there is no objection, this report will be received and spread on the minutes. I think the Chairman of the Committee on Credentials is present.

MR. STEVENS: You will pardon me a minute, but at sometime, at your convenience, as I am much interested in the subject under discussion, and would like to say something.

The CHAIRMAN: Very well, Mr. Stevens, perhaps we'd better have that right now, we have a little time. I think Mr. Stevens needs no introduction. He is the agriculturist of the Lehigh Valley Railroad and has been a great support to us in Bradford county in agricultural work along the line of the Lehigh Valley. I take pleasure in introducing Brother Stevens.

MR. STEVENS: Mr. Chairman and Friends: I had this matter in mind when I came down here, the matter of markets, and I was particularly anxious to say a few words on it because of the conditions which are existing in New York State where they have made an effort toward controlling this matter by legislation. They have done so there two or three times. First, there is a very severe law grading apples. Not only does the law specify the grading of apples very minutely, but it affixes heavy penalties for violations of that law. Next, they have established there a Bureau of Foods and Markets where the apples—and they began on apples, although some other materials are used—are taken from New York City and auctioned. Now regarding some of this matter, I don't know that I care to be quoted, but I am speaking to you frankly, as I have always tried to speak to you frankly. The Bureau of Markets, in the first place, is founded upon a most excellent idea, but it is not fulfilling the purpose in New York State in the marketing of fruit that, in my mind, it should, and the reason for that is this; it presupposes that the fruit of New York State should go to New York City, there is the only place where a market is held. The fruit of New York State does not go to New York City.

I made some very careful records of the fruit coming from along our line, the Lehigh Valley Railroad, and only 5% of it went to New York City the rest of it came down through here and went to Philadelphia; it goes to Altoona, goes to South Bethlehem, to Scranton, to Easton, etc., etc. The result of that food and fruit market has been to throw all the fruit into New York City in addition to what naturally went there, and today there is a great quantity of stuff in New York City for auction and not a proper distribution of that fruit. Do you catch the idea in my mind? And it is evidently the intention of the men here present who are guiding the thought of agriculture in Pennsylvania, to do something better in markets and no one knows better than all of us combined that something in that line is needed. The business should begin at the other end. There is material marketed that should be stored in the country, as I have

said before this body time and again, so that when the markets are open, it does not have to go to New York City or Philadelphia, but can go where the market demands. The storage should be out in the country and not in the principal consuming centers of the State. So far, so good.

Now then, I want to take up this matter that Brother Surface has brought up. It is true and absolutely true that we cannot co-operate in the sale of our fruit unless we have a standard pack which is reliable. If we make up a carload of stuff, half of it of nubbins and the rest of it with false heads, part of it with stove-pipe centers and the rest good fruit, that stuff cannot be marketed co-operatively because the person who is selling that stuff has no basis on which he can sell the goods. First, then, instead of making a Bureau of Foods and Markets, as has been done there, we should begin up the State with the grading of your fruit. Now it has gotten to be the habit in Pennsylvania, as in New York and New Jersey, if there is anything wrong, run up to the Legislature and get a law passed. If there are too many bugs on your trees, get a law passed; if you need more men on the farms, get a law passed; if you haven't got enough men on your railroad, get a law passed; if everything—

A Member: If we have too many men on the railroad, what then?

MR. STEVENS: Well, the effort is, in that event, to get it repealed, but we can't do it always, brother, justice does not always come. Friends, I question that if we had, in the State of Pennsylvania, an association which was binding, which took in every grower of first class fruit within the State of Pennsylvania, and they had their officers and got together and made rules and regulations regarding the packing of the fruit, the packages of those members to be stenciled and stamped, those rules and regulations, backed by the dealers, would have more force than any law that could be put upon the statutes of this State; isn't that so, Brother Surface?

PROF. SURFACE: Sure.

MR. STEVENS: Now, then, if you do that, you will have an association which can make better rules and regulations than any legislation can make by its laws because you are handling it yourself and you cannot always get what you want in the Legislature, any more than we can. I have found that out, so this is the thought I wanted to leave, to sum it up, and I don't want to take any more of your valuable time in that matter of marketing—I want to urge this body and the Horticultural Society, if you want some laws temporarily, all right, go to it, but in the end, you try to control this thing by rules and regulations of a co-operative body of horticulturists in this State, so that their rules and regulations will fix the marketing of the fruit of this State, then you will win and win more effectively than you will with legislation.

The CHAIRMAN: We will now have the report of the Committee on Credentials.

Mr. Fenstermacher then submitted the following report:

REPORT OF THE COMMITTEE ON CREDENTIALS

We, the Committee on Credentials, beg leave to submit the following report:

We have examined the credentials of the following:

County.	Name.	Post-Office.
Fayette,	John T. Smith,	Dunbar.
Fulton,	Frank Ranck,	Hancock, Md.
Lackawanna,	Horace Seamans,	Factoryville.
Lebanon,	Edward Shuey,	Annvile, R. D. No. 2.
Mifflin,	C. M. Smith,	Lewistown.
Wyoming,	Geo. A. Benson,	Tunkhannock.

We found the certificates of the above in regular form, but with no seal of the organization having elected them.

The following were in regular order:

County.	Name.	Post-Office.
Berks,	H. G. McGowan,	Geigers Mills.
Bradford,	Louis Piolet,	Wysox.
Cambria,	L. J. Bearer,	Hastings, R. D.
Clarion,	J. H. Wilson,	Clarion.
Clearfield,	T. L. Way,	Curwensville.
Columbia,	A. C. Creasy,	Bloomsburg, R. D.
Elk,	John G. Schmidt,	St. Marys.
Erie,	D. Warren DeRosay,	Corry.
Indiana,	S. C. George,	West Lebanon.
Jefferson,	Peter B. Cowan,	Brookville.
Lawrence,	Doris L. Fulkman,	New Wilmington.
Lycoming,	B. F. Kahler,	Hughesville.
McKean,	E. A. Studholme,	Smethport.
Monroe,	F. S. Brong,	Saylorsburg.
Montour,	J. Miles Derr,	Milton, R. D.
Northumberland,	Wm. A. Fisher,	Milton.
Perry,	Clark M. Bower,	Blain.
Philadelphia,	David Rust, Hort. Hall, ..	Philadelphia.
Schuylkill,	John Shoener,	Orwigsburg.
Susquehanna,	E. E. Tower,	Hallstead.
Venango,	Homer C. Crawford,	Cooperstown.
Westmoreland,	W. F. Holtzer,	Greensburg.

B. F. Kahler, of Lycoming county, was elected to fill the unexpired term of A. J. Kahler, who resigned on account of ill health. His term will expire in 1918.

Homer C. Crawford, of Venango county, was elected for the term of one year. His term, therefore, will expire in 1917.

The Chester Co. Agricultural Association sent credentials electing Norris G. Temple as their member, but owing to the fact that no vacancy occurs the same could not be acted upon at this meeting.

The following delegates have been elected, whom your Committee would recommend to be seated and have the privilege of the floor.

Cyrus T. Fox, K. W. Robinson, J. S. Kepner, J. S. McLaughlin, Clark G. Long, S. D. Bashore, M. D., Samuel Imboden, John Hershey, Joseph Wolgemuth, John L. Shirk, John F. Brubaker, and S. P. Heilman, M. D.

P. S. FENSTERMACHER,
B. F. WAMBOLD,
G. F. BARNES,

Committee.

MR. FENSTERMACHER: In reference to the delegates whose credentials bore no seal but were otherwise regular,—what disposition are you going to make of them?

MR. SEAMANS: If it will please the Chairman and the State Board of Agriculture, I would say for Lackawanna county, that we have no seal.

MR. HUTCHISON: Are these in due form?

MR. FENSTERMACHER: Regular with the exception of being minus the seal.

MR. HUTCHISON: I move that they be accepted and the Secretary requested to secure a seal.

The motion was seconded and adopted.

MR. SCHULTZ: What would you do in a case where we had no seal?

MR. HUTCHISON: You can buy one down here very cheaply.

The CHAIRMAN: I think that matter is settled.

MR. FENSTERMACHER: It is deemed proper to have a seal; every chartered organization has a seal or ought to have one, if they are worth existing.

MR. SEAMANS: Lackawanna county had a seal but lost it.

The CHAIRMAN: Gentlemen, you have heard the report; what is your pleasure? Can the Committee tell us whom these delegates represent, whom you have recommended in the last paragraph of the report, to be seated?

MR. FENSTERMACHER: Prof. Fox represents the Horticultural Society of Berks County and the rest are all representatives of the Lebanon County Association.

On motion, the report of the Committee on Credentials was accepted.

MR. HUTCHISON: I move that the Hon. W. F. Hill and J. K. Runk, as delegates from Huntingdon County Agricultural Society, be admitted to the meeting.

The motion was seconded and adopted.

MR. FOX: My name has been mentioned. I am here as a representative of the State Horticultural Association, and I would say that 39 years ago, when the State Board of Agriculture was organized, I was one of those present. There were sixteen present at that time: The counties of Berks, Lancaster, Lebanon, Dauphin, Cumberland, Chester, Bucks and Lehigh were represented, along with the Governor of the State of Pennsylvania, Gen. John F. Hartranft, the Superintendent of Public Instruction, Hon. John James Wickersham, John MacDowell, of the State Agricultural Society and others. Thomas J. Edge, of Chester county, was elected Secretary by nine votes. Your humble servant had five votes and Mr. Nice, of Montgomery county, had two votes. I am glad to be able to be with this honorable body today, as one of the few survivors of 39 years ago, still active in the cause of agriculture and horticulture in Pennsylvania. In 1870, 46 years ago, I joined the State Horticultural Association of Pennsylvania. For 27 years I was Secretary of the County Agricultural Society of Berks county. I was the first Pomologist of this Board and I have been meeting with you a number of times in the past, and now at this late day I am happy to be with you again.

MR. HUTCHISON: I want to beg the gentleman's pardon; if I had known he was here I would have had him stand up this morning as a living witness. I move that Hon. W. T. Creasy, of Columbia county, Secretary of the National Dairyman's Association, be recognized as a delegate to this body and given the privilege of the floor.

The motion was seconded and adopted.

The **CHAIRMAN:** Are there any further recommendations? Gentlemen, I think we have worked pretty steadily this forenoon, and it is now a quarter to twelve, and this afternoon at 1.30 prompt—

MR. J. ALDUS HERR: Excuse me, Mr. Chairman; I would like to make an announcement. As soon as we adjourn I wish the members of the Committee on Resolutions would meet in the back part of the room. The members are Col. Woodward, Mr. Killam, Mr. Hutchison and Mr. Black.

The **CHAIRMAN:** Gentlemen; will you please come promptly at 1.30, as we want to correct the roll a little more, and the election of officers is the first thing on the program. We now stand adjourned until 1.30.

Wednesday, January 16, 1916, 1.30 P. M.

Vice-President Kerrick in the Chair.

The **CHAIRMAN:** The meeting will please come to order. The Secretary wishes to go over the roll again.

(Assistant Secretary Weld again called the roll).

The **CHAIRMAN:** Next is the election of officers, and we are ready to receive nominations for the three vice-presidents.

MR. J. ALDUS HERR: I want to place in nomination the gentleman who has been attending these meetings for quite a long while, who is an active member, who takes an active interest along farming lines in more ways than one, in fact more than a great many of us. I refer to Mr. Fenstermacher, a man who has been active in service ever since I have been a member of the Board, and perhaps for a good while longer. I nominate Mr. Fenstermacher for first Vice President.

Mr. Blyholder and Mr. Hutchison were next nominated.

MR. WELD: I would like to nominate a man from northwestern Pennsylvania; we don't often get a man there; I wish to nominate Mr. Studholme, of McKean county.

It was moved that the nominations close.

MR. HUTCHISON: In order that we won't have to go to a ballot, I ask the privilege of withdrawing my name and that will just leave the three brothers, and they can be elected by acclamation.

ASSISTANT SECRETARY WELD: Then the nominees are Mr. Fenstermacher, Mr. Blyholder and Mr. Studholme.

It was moved and carried that the Secretary cast the ballot of the Board for the foregoing nominees, there being no opposition. The ballot was duly cast and the result announced.

THE CHAIRMAN: Mr. Fenstermacher, will you please come forward? Gentlemen of the Convention, in retiring from this office, I want to heartily thank you for your confidence reposed in me during my time with you on the Board. I have formed many friendly relations with the members during my term here. I have not asked the Board for a favor but what you have complied with my wishes. I asked you to come to our county a few years ago for your Round-up, and you complied with my request; I appreciate it very much indeed. You had the confidence to place me at the head of your Board as your Chairman, for which I want to thank you very kindly indeed. My time having expired as a member of the State Board, and our Agricultural Society, in Bradford county requesting that I should be their President, I withdrew as a candidate with the complete understanding with my successor, Mr. Piollet, whom you all know and whom we are all proud of in our county. I want to say at this time that I think Col. D. E. Piollet, Mr. Piollet's father, did more for agricultural work in the State of Pennsylvania than any man existing today. You know Brother Piollet's son, Louis Piolett who is the State elector of your Grange today. I am associated with him in the agricultural work at home, and we are proud of him as a young man, and all I ask of you gentlemen, is to give him the same kind of treatment you gave to me and I will appreciate it very much indeed. Mr. Piollet is an extensive farmer, having some six or eight hundred acres of land along the Lehigh Valley, and that is his occupation, tilling the soil. In my opinion, those are the kind of men that should be at the front of this organization, practical farmers. I have in my library a picture that I hold very dear—the members of this State Board, and I shall call you to my memory as I observe that in the future with a great deal of pleasure. Now gentlemen; without taking any further time, I want to thank you for your courtesies to me.

Vice President Fenstermacher in the Chair.

The CHAIRMAN: Members of the State Board: I want to thank you for this honor conferred upon me. If I had been aware it was going to come off, I would have prepared a speech. Under the circumstances, I will say just a few words to bring before some of the people, at least in contravention of the many people, hold that all a farmer should do is to raise more crops, more per acre so that the consumer can live cheaper—I, for my part, protest against that sentiment being spread abroad amongst the people of this State. Before I am going to make two blades of grass grow where one grew before, I want to know what I will get for that extra blade; I want to know where my market is. That sentiment seems to be going abroad by well meaning people—nothing personal in this—it is bewailed all over the State, particularly by these theorists that can plan out all these schemes in the way of a dream, balance up all these conditions. But we who are up against these things have got to face the knocks and make a living out of these things, we know that those theories, as a rule, don't hold out.

What I have in mind, what I refer to is these well meaning people, what I have in mind is this, the fault of agriculture, of the high cost of living or the cost of high living or whatever you call it, is not caused by underproduction, not by a long sight, it is caused by the faulty distribution of these products; it is too expensive, there are too many men in between. Take for instance the case in my town where peaches were selling at 30 to 40 cents a basket, 16 quart basket, and retailing in the same town at 10 cents a quart, the consumer paying 10 cents a quart or \$1.60 a basket for a basket for which the retailer paid 40 cents. There is the trouble. How are we going to correct this? Not by having the producer grow more of it. Lots of stuff went to waste all over the State, peaches, apples, and truck in particular. Thousands and thousands of dollars' worth went to waste just because of this faulty distribution. Adaptability—adapting your location and your manner of rotation, of growing crops to your nearby markets or your distant markets, is a point we ought to speak of. I just bring up these points to show at least that some people know the situation. If there is anybody needs to be educated, it is the city man, he certainly needs to be educated how to buy, and a Press Bureau supported and run by the State Department of Agriculture, would do more good to everybody, just keep the people posted on the value of things, the cost of producing those things, and in what quantity and how to buy them, that would do more good than continually harping on this question of growing more of it.

You know how it is, you attempt to raise the price of milk one cent a quart, just one cent a quart—why, the city people will all take it up and call you a robber, a thief, a murderer of babies, and everything else, and yet it has been done and will be done again in other lines; the moving picture shows can double their price of admission, shoes are higher and everything is going up and nothing is said. Higher prices for these luxuries are all accepted, no farmers seem to grow those. Why is it? It simply shows that the consumer, the city man, needs education more than the farmer on these lines. It may be well to pass a resolution to bring out some of these points;

I just throw these thoughts out as a feeler; if you agree with me, you can bring up something of that kind through the Resolutions Committee and see what we can make out of it, see if we can make some impression somewhere to correct some of these false ideas.

Next on the program, I believe, is the election of an Executive Committee, nine members, the Secretary being a member ex-officio. I will be glad to receive nominations.

The following members were then nominated: Matthew Rodgers, Chairman, H. G. McGowan, W. F. Biddle, C. M. Bower, W. F. Throop, Dr. W. Frank Beck, J. Aldus Herr and B. F. Killam.

On motion of Mr. Kerrick, the nominations were then closed.

On motion of Mr. Joel A. Herr, the Assistant Secretary cast the ballot of the Board for the nominees and they were declared duly elected.

The CHAIRMAN: If you will allow a suggestion from the Chairman, I suggest that it would be well to meet immediately and get busy.

MR. HUTCHISON: I move that we now take up the question of where the Round-up meeting is to be held.

MR. KILLAM: I would not think a motion would be necessary, if there is no objection to it.

The CHAIRMAN: Well, the Chair is ready to receive nominations.

MR. H. G. MCGOWAN: It affords me pleasure to extend a hearty and cordial welcome to hold the summer meeting at Reading, the capital city of Berks county. It is an old proverb "that coming events cast their shadows before," and I find that the members of the Board have all, I suppose, received a letter from the Chamber of Commerce of our city extending this invitation, and all I have to do is simply endorse that invitation, which I am glad to do.

Again, there has been a little booklet since the convening of our Board here placed in the hands of our members, which is only indicative of the hospitality of our people, a little pretzel book, and that which goes with the pretzel you will have to come to our City to enjoy. (Laughter) We have ample hotel accommodations and excellent railroad facilities. I really did not know that our county possessed so many points of interest until I opened this little pretzel book, and it would be foolish for me to take up your time to enumerate them. You can just refer to your pretzel book, which will be a safe guide for you when you come over to Berks county. We have mountain scenery, railroad scenery and lakes and breweries and I don't know what all, and one of the principal things we have there for your safety is a guaranteed fire-proof hotel, second to none, I believe, in the State of Pennsylvania. The Horticultural Association held their convention in this Hotel and was very well pleased. Without going over the ground any further, I will just repeat that I hope Reading will be selected as the place for holding our next Summer meeting.

MR. FOX: I desire to say a word more in behalf of the City of Reading. It is where my home is, where I have spent the years from my birth to this time with the exception, perhaps, of a few years that I lived in the South, still maintaining my residence and voting place in Reading, but there is no more beautiful place on the globe than the City of Reading. I was at a meeting some years ago of the National Editorial Association, and a delegate from Wisconsin, when his name was called and the name of his place, Oconomowoc, he said, "Please mention that again," and then they said "Oconomowoc," "Yes, that's the spot," and Reading is the spot. We have scenery there among the finest in this country, and if you come there at that pleasant summer time with our mountain railroad to take you over Mt. Penn and Mt. Neversink, you will find a people ready to greet you, ready to accompany you, ready to show you what we have. We will not say what the pretzel book tells you about nor what you will get to eat nor what you will get to drink there; that you will find out for yourselves. But in behalf of the Chamber of Commerce of the City of Reading, the Agricultural Society of Berks county and all our organizations there in the interest of progress, in the interest of the public, I second the invitation that you meet next Summer in the City of Reading.

MR. SCHULTZ: A couple of years ago I started a movement to bring this body to Norristown and a great many of you good friends promised to stand by me through thick and thin when the proper time would come, but I want to say this; I have made an investigation quite recently through our town and I find that our hotels are filled from garret to cellar with business people, a great many of our traveling men have to go to the City of Philadelphia to get accommodations over night, and under those conditions I do not think that I have a right, when we have a chance to go to Reading, that I have a right to ask you to come to Norristown, and I want to avail myself of this opportunity to release those friends from that promise and I ask them to give their support to the motion to go to Reading. I think that will be great. I was raised in Berks county and I have a right to talk for Reading too. I don't need to tell you that, you can hear that in my speech.

MR. GEORGE W. BARNES: I think as we have had the opportunity to visit the different sections of Pennsylvania; we have had some very warm receptions, referring both to weather conditions and the friends we met in those places, and also some cool ones, and especially the weather on the last occasion when we went to the northwestern part of the State last year. I, therefore, think it is about time that we bring this matter to a close and let Reading have this meeting with the unanimous vote, and that is my motion.

The motion was seconded and adopted.

The CHAIRMAN: I am not certain there is going to be a Spring meeting, but nevertheless put it to a vote. If there is no further special business, we will continue with the program, and next is the report of the Chemist, Dr. William Frear, of State College.

DR. FREAR: Mr. Chairman and Gentlemen: I am surprised, speaking of the advantages of Reading and what it has done and is

doing for the State, that they failed to mention that Reading gave you your present chemist. I am sure that if you appreciate Reading at the time you visit it as much as I did as a boy from no time till I was twelve years of age, you will find it a delightful place indeed. I only regret that I have not been able, of late years, to enjoy the hearty friendship and hospitality of its citizens as I did in my boyhood years.

I want to speak to you briefly this afternoon upon two topics, both relating to the fertilizer question and the fertilizer situation. I suppose we have never had such a lesson on the interdependence of the nations of the world as we are getting to-day.

Dr. Frear then presented the following report:

FERTILIZER CONDITIONS AND OUTLOOK: THE SYSTEM OF VALUATION.

By DR. WM. FREAR, *Chemist.*

The fertilizer situation in America is a beautiful example of the close commercial interdependence of the nations of the world. As soon as the European War began, export demand raised the prices of our grain crops, our draught animals and presently of our cotton. Then followed a heavy demand on our metal supplies, our automobiles, and then upon our chemical resources. Old factories were reopened and new factories of vast area were hastily built, and the land was literally scraped to create the raw material stocks from which the vast demand for finished chemical products, munitions and medicines, might be supplied.

At once, the merchant fleets of Germany were gathered into safe harbors at home and in neutral ports; and a large fraction of England's transportation facilities were diverted from mercantile uses to those of war transport. War risks increased insurance rates. Here we were not only cut off from Germany's great system of chemical works, but with the prices of chemicals in neutral countries increased and our means of transporting them made scarce and expensive.

We had been inclined to boast of our own natural resources, and in the habit of thinking that they would, in time of need, make us absolutely independent of all outside supplies. Now we find that natural resources, however abundant and varied, serve no useful purpose until developed. All the gold in Solomon's mines never paid a store-bill, so long as it remained in the mine. In these days, large natural resources cannot be developed or utilized until capital can be enlisted, secured by proper legislation and assurance of suitable national economic policies, and until our technical experts shall have devised suitable systems of production. These preparations take time. The war found us unprepared for its exigencies just as truly as if a hostile fleet had appeared to land an army of 500,000 foemen upon our shores.

England established her so-called blockade of German ports, and Germany put an embargo on potash export—partly to protect her own food supply, partly to embarrass crop production in enemies' countries and doubtless to cut off the supply from which potassium chlorate and related explosives might be made for the use of the enemy. Muriate of potash, worth \$38. to \$40., on our markets in August, 1914, by January 1915, had jumped to \$60.; by March, to \$114. by June, to \$225; by November to \$260.; and a month later, to \$245; and now are announced small lot sales at \$375. to \$600. a ton. Our munition makers have far outbid ourselves and the fertilizer makers who work for us, and have gone out in the neutral world, as far as Java, to gather in the available small stocks of potash salts. All the other potash salts followed the muriate in disappearance from the market and in elevation of price, although their price levels did not reach that of the muriate.

Meanwhile there has been much talk about the great stocks of potash in our feldspar and other potash silicates and, here and there, somebody has gone to the expense of grinding fine some of these rocks, a process that makes them little more valuable as potash foods for plants than so much sea sand. Our geologists have bored the West for saline potash deposits, without finding anything of much economic promise. Several heavily capitalized concerns have begun to work Utah alunite deposits for both potash and alumina, without any promise of a protective tariff for potash, after the war, and without a certain market for their alumina output. The coastal waters of California bear great crops of giant kelp rich enough in potash to equal in number production our usual potash imports; but California legislation offers little protection to capital that might be gathered to utilize the marine products within California territory. So our potash production has been limited to a little dried kelp and saline kelp extract made by several small concerns, a carload or two of potash derived from alunite, and some that has been extracted by washing the flue dust of cement factories.

How about our phosphoric acid and nitrogen supplies? We have abundance of phosphate rock, but war conditions caused unsettled mine operations. Stocks are low, but prices have held at about \$3.62½ a ton for South Carolina kiln-dried rock, and at \$5. to \$6.50 for Tennessee, 80% rock. We use most of our phosphorus in the form, however, of acid phosphate. The price per unit of 20 pounds of available phosphoric acid held firm at 47.5 cents from January to September 1915, when it began to increase. In October last, it was 77.5 cents, and in December, 82.5 cents. Now, the wholesale price of 16% rock, held firm at about \$14.00 a ton, and our retail prices will probably run from \$18. to \$20. for goods of this grade.

This price change in acid phosphate is due not to the raw phosphate, but to the sulphuric acid. We made more sulphuric acid in 1915 than ever before, but the demands of the munition makers outran the supplies and prices went up. Our sulphuric acid makers have obtained their sulphur in small part from the brimstone of Sicily, and the deep sulphur deposits of Calcasieu, Louisiana, but chiefly from pyrites. Newfoundland, Virginia and Huelva, Spain, were our considerable sources of supply, especially Spain. Furnaces adapted to pyrites can not quickly be changed to burn sulphur. Spanish pyrites,

found transport difficult and freight high. The prices of refined pyrites have advanced one-sixth; and of crude, nearly one-half. Hence 60 degrees sulphuric acid which was quoted last August at \$.80 to \$1.00 in bulk, now commands \$2.00 to \$2.50 and even to \$4.50. America wastes from her smelters, furnaces and coke ovens vastly more sulphur than she converts into useful products. Slowly we are devising means to reduce this waste. In 1915, one-fifth of our sulphuric acid was recovered from smelter fumes. The 25% increase in production from this source has been too small to meet increased current demands. Basic slag phosphate came wholly from Europe. None is now imported.

As to nitrogen, we have depended chiefly on our own organic supplies, with additions of Chilean nitrate of soda, English sulphate of ammonia and a little American cyanamid. Most of our own nitrate imports went, before the war, into chemicals and explosives; about one-third into fertilizers. The war at first paralyzed, later stimulated the nitrate mining. Chilean prices rose. Then the Panama Canal was blocked, stocks accumulated in Chile and prices fell one-fifth, but ocean freight rose from \$14. to \$17. a ton, owing to the long carriage by way of the Straits. These several price factors led to the fluctuations in nitrate of soda wholesale prices in our markets. Jan.—May 1914, \$2.22 cwt; June—Jan. 1915, \$2.18-\$1.90; Feb.—Aug., 1915, \$2.05-\$2.45; Sept. 1915, to date \$2.50-\$3.75.

The sulphate of ammonia is largely of English origin. Domestic resources are little utilized, and the domestic output is too small to determine the price situation. From a wholesale rate of \$2.85-\$3.00, the price has advanced to \$4.00.

Our cyanamid manufacture is assuming respectable proportions, but the supplies are still too small, considerably, to affect the nitrogen situation.

Finally, as the natural result of conditions in other nitrogen staples, the demand for our organic ammoniates has risen relative to the supply, with a consequent rise in market price. High grade blood which sold, wholesale, at \$2.75 a unit of ammonia in Jan. 1913; at \$3.30 in Jan. 1914; fell to \$2.95 in January of last year; and to \$2.75 in early July; but has now risen above its old level, to \$3.40. Concentrated tankage prices, have followed the dried blood variations, with price per unit differences of 15 to 20 cents for nitrogen and with a steady allowance of 10 cents a unit for bone phosphate of lime.

Our fertilizer makers have bought their stocks under these market conditions. It is stated, however, that Southern stocks have not been wholly completed, owing to the uncertainty as to the 1916 cotton acreage. If the acreage should be much decreased, present cotton stocks will suffice. If not, prices of ammoniates are expected to advance rapidly within the next few weeks.

The scarcity and high price of potash has forced difficult decisions upon the fertilizer maker. He has decided to conserve his stocks, to divide them among his customers at comparatively small advance over their original cost price, and to maintain as fully as possible his main lines of complete fertilizer. This means continued provision for crops relatively little in need of potash, but inadequately supply for those crops most in need. Still, many brands have had their potash content greatly reduced. In the Fall of 1914 official fertilizer samples,

of the complete type, there was 3.33% of potash on the average; in those collected in the Fall of 1915, 1.94%. The corresponding collections of rock-and-potash fertilizers contained 3.41 and 1.87 per cent. of potash, respectively. No dissolved bone phosphate was found in the 1914 Fall collection; this Fall, 32 such brands were collected and analyzed.

The relations of selling price to commercial valuations at rates fixed in the Spring of 1915, were, for the principal classes of fertilizers sold last Fall:

	Selling price	Valuation
Complete fertilizers,	\$21.79	\$23.13
Rock-and-potash,	16.89	15.75
Dissolved bone,	21.52	18.32
Dissolved rock,	13.83	13.41
Ground bone,	32.79	33.56

These figures speak for themselves.

The raw materials market open to home-mixers has been much contracted. The trade in mixed goods has always supplied reluctantly the materials for home mixing, though the potash and nitrate propaganda have encouraged it. Still, ready cash always has a commanding voice, and home-mixers paid cash; while sales of ready mixed goods through middlemen, were on long credit basis. There is an agitation in trade circles for placing all fertilizer sales on a short-time credit basis, and it is urged that farmers are now so well supplied with cash that the present is an opportune time for the credit readjustment. Those behind this agitation say that, with such adjustment accomplished, the cash proffer of the home-mixer will be less attractive.

With potash scarce and fertilizer prices high, what is the farmer to do? Let him keep a clear head, in the first place. His products sell readily at a high price, and the fertilizer is a minor element of crop cost. He has heretofore bought with more thought of spending little for fertilizer, than of getting for his dollar the most he can secure of what his crops actually need. He has not been most careful of domestic fertilizer supplies, though more careful than he was a few years ago. He has been tempted to consider potash and nitrogen applications more important than the crops said they were, as compared with available phosphoric acid. He has often fed his quickly grown, intensively worked crops of high price, little more than he gave to his long-period machine-works grains and hay. In the present emergency, he may have to do without much potash, but, as Dr. Jenkins of the Connecticut Station pithily says—"he should do more *with it*." In addressing you last year, I discussed the principal methods by which the farmer may meet the potash shortage. I have little to add to what I then said, and will not take your time to re-discuss the subject.

FERTILIZER VALUATIONS

When, 27 years ago, I was first charged with the care of the official fertilizer analyses, I was required to attach to the analyses certain approximate valuations of the respective samples, and this requirement has continued. A like requirement exists in most other fertil-

izer controls of the Eastern and Middle states, though New York has long abandoned the practice.

Doubtless, the reason for the requirement has been the supposed simplicity of comparison it affords to the buyer, who, at the outstart and too often even yet, has little clear appreciation of the meaning of the analyses with which the valuations are associated.

It may be a surprise, therefore, when I tell you that I know of no fertilizer control officer charged with the responsibility for making the valuations, who does not regard the policy as unfortunate for the fertilizer buyer, and who would not gladly be relieved of the requirement that he make such valuations.

The reasons for this attitude are these, in part:

(1) The buyer too commonly regards the valuation to be based strictly upon the analysis. It is not so based. It states only the cost of the same weights as appear in the goods, of fertilizer constituents bought in high-grade materials at average market prices; whereas the fertilizer may have been made of cheaper, low-grade materials.

The Chemist soon reaches the limit beyond which present methods afford no clue to the nature of the raw materials used.

(2) The buyer ought to consider his crops needs first, and then try to supply their fertilizer requirements as economically—I don't say "as cheaply"—as he can. The valuation system tends to make the buyer look to see that the selling price is not above the valuation and, if satisfied as to this, to buy without making sure that the fertilizer is what his crops want. The result is as though, having secured your wife's promise to bake you a cake upon your own promise to buy the lacking raw materials, you were to visit the store, and and finding flour worth much less a pound than sugar and butter, were to carry back to your wife only the flour, while she had neither sugar nor butter; or, if in other cases, you having bought some of each cake ingredient known to you, at an average low price, your wife were to say she already had at home plenty of sugar and butter, but that you hadn't bought enough flour. How much cake could you expect? As the fertilizer control official has considered the great degree to which the commercial valuations are mis-applied, he has reached the conclusion that a current review of fertilizer conditions without the attaching of valuations to individual analyses, would promote intelligent fertilizer buying; but that the present system of an assumed valuation accompanying each analysis, retards the development of intelligent buying. The subject is one deserving your careful consideration.

The CHAIRMAN: We are considerable behind time according to the schedule of the program here; but this is a very important question, a vital question, and we will allow some time for discussion. I don't hear any. The report will be received and included as a part of the proceedings. Next, is the report of the Veterinarian, Dr. C. J. Marshall.

Dr. Marshall presented the following report:

REPORT OF VETERINARIAN

By DR. C. J. MARSHALL

Mr. Chairman and Members of the State Board of Agriculture: A year ago when our meeting was convened, we were in the midst of a bad rumpus on account of foot-and-mouth disease in the State. Since that time the work has been cleaned up satisfactorily in Pennsylvania. If nothing more happens, I think it would be well for us to consider today of things that were done during the last outbreak, or might have been done, to make matters better, and I think it would be a good plan for us to review a little what has happened and see if we are not prepared to handle another situation of that kind with better results than this last one.

I did not prepare a paper on the subject; I just want to consult with you and see if you know of things that were done that should not have been done or if we could have done the work any better than we have. You may think in my making the statement to you that I have in mind, that I am inclined to brag about what happened, but that is not the purpose. I want to tell you just what happened as near as I can in the fifteen minutes allowed to me, and see if you have any suggestions to make that will improve matters.

Now, a year ago, the nineteenth of October, 1914, the acting chief of the Bureau of Animal Industry called our office on the phone and told us that foot and mouth disease had been diagnosed in the southern part of Michigan, that they had two counties in the southern part of Michigan in quarantine and two in the northern part of Minnesota and that the quarantine was sufficiently broad to cover all the danger at that time. That struck the men connected with the Board much harder than probably it would have struck you if you had heard the same message. We realized the importance of foot-and-mouth disease in this country and got busy at once. Within two hours we had a letter run off on the mimeograph and mailed to over 1,800 veterinarians in Pennsylvania and all commission men and cattle men as far as we had a list of those people. We had that letter in the mail in less than two hours, warning them of the danger of the disease, stating where it was located and telling them to be on the lookout for it and to telegraph or call us on the long distance telephone if anything suspicious developed in their territory.

Fortunately in the nineteen hundred and eight outbreak, which occurred six years before, Dr. Pearson was then State Veterinarian, and after the outbreak was over he wrote a careful description of what had happened in that outbreak, just how the work was managed, all the precautions taken, etc., and a more complete description of what happened in that outbreak I doubt if it is possible to write up. As soon as we had our letter out of the way, we began to review our literature and see what was recommended to be done and read over the regulations and symptoms of the disease and try to get ourselves ready as fast as possible, if anything did happen. We notified our agents in Pittsburgh and had a good corps of train men in the Pittsburgh office and the Lancaster office to watch carefully for any ship-

ments from the West that came through those points for symptoms of foot-and-mouth disease, and men were put on their guard watching every shipment that came through.

Another thing we did, we sent a good man to Chicago to see if there was possibly any danger there. He went out about the 24th of October and he looked the situation over there to keep track of what was going on and see if there was any danger of infection getting into the Chicago stockyards, and reported no suspicious cases in Pennsylvania until the 29th of October; that was ten days after we got the notice, then we had a true case of foot-and-mouth disease in the Pittsburgh yards and three herds affected in Lancaster county, but none of those animals had gone through the yards with the disease, they had gone to the farms and developed the disease there. We looked over 1,350 cattle in the Lancaster yards and did not find a symptom of disease, three days after the examination was made, but we found the disease on the farm.

That outbreak turned out to be the worst calamity we ever had in the way of contagious diseases among animals in America, and I brought you this outline to show you something about the statistics of the disease in the country. I presume you are familiar with it, but I just want to call your attention to the way the thing was distributed. This gives you the number of states in which the disease occurred, the number of counties in each state and the number infected. You will notice that in Illinois they had 102 counties in the state, of which 52 were infected; number of herds infected, 768; number of premises infected, 709; in Pennsylvania we have 67 counties, of which 34 were infected; number of herds infected, 858; number of premises infected, 795. I will not read over the whole chart, but Illinois was one of the worst infected states in the Union. More than half the animals that were killed were in the State of Illinois. The number of cattle slaughtered was 24,338; number of swine slaughtered, 33,434; number of sheep slaughtered, 1,248; number of goats slaughtered, 22; total number of animals slaughtered, 59,024, in Illinois on account of this disease.

The first infection they found on November 1, two days after we found it in the Pittsburgh yards, and the last case they had till this report was made was April 23, but since that they had a second outbreak and that has added a good many animals to the total reported here.

It is estimated that it cost the State of Illinois \$200,000 to clean up this second outbreak, and just last Saturday they had another little outbreak in the central part of the State. They found the disease on one farm there; a suspicious lot of hogs were received in the National stockyards at East St. Louis, Illinois; the Federal Government sent men back to that section to look over the animals in that community and see if the disease existed there; they were not quite sure on this shipment that came into East St. Louis, but they sent their men back to the neighborhood from which the hogs came and they located one definite herd there that was positively infected with the disease, and 16 head of cattle and 24 hogs in that herd. They had one other farm in the neighborhood that was suspicious. The Government immediately quarantined that county, and they do not know from what source that infection came. That is a disagreeable

feature of the thing; if we knew where the infection came from, we would be more contented about it, but previous to that, the last disease they had in Illinois was the 25th of December, in Lake county, Illinois. That was not very far from the Durand herd where there was so much excitement before they could destroy it.

The second outbreak has cost the State of Illinois, or will cost them, \$200,000 to clean up, and it came from infected hog cholera serum made the last of October, and from some hogs that came from the southern part of Michigan, and it was not known at the time that they had the disease, but it was found later that that serum contained the disease and started up a new outbreak in eight different counties in Illinois and one county in Minnesota, and one outbreak in two other states. But we did not feel so uneasy about that one as this one at present, because we know where the infection came from, and in the case of this one we do not.

You might want to know what Pennsylvania is still doing to keep her herds free from the disease. The first infection we had in Pennsylvania was November 1, as the Government has it reported here, but it was the 29th of October. Our last case was the 29th of April. So far as we know, we have not had a case of foot and mouth disease in Pennsylvania since the 29th of last April.

Now we have been watching Illinois with a great deal of interest, and the situation there at the present time is this; we are not accepting shipments from Chicago or East St. Louis for any purpose except immediate slaughter, and then they must go into slaughter houses that have Federal inspection or some kind of inspection, or the owner of the slaughter house must give us a sworn statement that he will kill all the animals he receives inside of forty-eight hours. We allow them to unload animals for feed, rest and water at stockyards if they are willing to handle animals of that kind by themselves and will not let animals used for dairy purposes go through those places afterward. There is only one stockyard that is willing to handle those animals in that way and they have a permit for unloading them for food, rest and water in the Connellsville stockyards, but the Pittsburgh, Erie and Lancaster stockyards have decided that they won't bother with those interstate shipments. We have had this same kind of regulation in Chicago all the while up to the present time, but today we have added in the same category shipments from East St. Louis. I think we are perfectly safe; I do not believe there is any danger of the disease springing up in Pennsylvania again unless we bring it in. I think the time has already passed when we need not feel any uneasiness from infection lurking around in the State, but there is danger, if we are not very careful, of getting the disease from Illinois.

Now, I want to say something about what our Legislature did, and what the Board did, etc. In Illinois they have not yet paid the farmers the indemnity for the cattle destroyed, and that amounted to \$1,600,000, and this last outbreak will add \$200,000 to that. Governor Dunne called the Legislature together in special session to appropriate money to settle these claims of the farmers and the farmers are all on the job trying to do their part; the members of the Legislature representing the agricultural districts are on the job trying to get the necessary appropriations to settle up these claims, but for

some reason they do not get a quorum. Men not directly interested in agriculture are not attending the meetings and the farmers are pretty badly discouraged out there for the reason that they haven't gotten their money. Just last week the Congressman-at-large from Illinois introduced a bill in Washington to see if the Federal Government would not put up \$1,800,000 to pay the indemnity for the State of Illinois. The Federal Government had paid its half, but Illinois wants the Federal Government to pay Illinois' share of it. I don't know where they will come out on that kind of proposition, but all the other states paid their bills and I expect Illinois will do it too, but it is a pretty big burden.

In our State it cost \$625,000 to pay for our troubles, and so far as I know, all just claims have been paid. You have heard probably that in the 1908 outbreak some of the farmers did not get paid for their stock. As far as we know there is not a claim filed that has not been paid unless there is some hitch about the payment of that claim, and it is interesting to contrast the way Pennsylvania does business with the way they do it in some other states. When our Legislature was called to order in Harrisburg in 1915, about the first thing done was to put a bill in their for money to pay the indemnity for the cattle destroyed up to that time, and that appropriation was granted in full and the Governor signed it as quick as he could get hold of it. There was not a word against it in either the House or the Senate. They put the money up as generously as for any purpose you can imagine, and then later we had to ask for \$125,000 more, the first amount was not enough, and that came just as cheerfully, and I don't know how you could ask our Governor or Legislature to have done any better than they did with the appropriation part of it. A good many members of the Legislature felt that it was not right that our law should limit us in the extent of appraisement that we should make on animals that were ordered to be killed for the good of the public. Under the old law we were limited to \$40. on non-registered animals and \$70. on registered cattle, and our law will not allow us to pay more than \$10. for a sheep or more than \$10. for a hog, and you know very well that is a pretty small payment for some of our good hogs, and the sheep men and hog men looked upon it as a joke. The Legislature felt that that limit on animals should be removed in a case like that of foot and mouth disease and that if the State is going to kill them by force or make the farmers kill their animals for the protection of the public that they should pay full value for them, and that bill was introduced and went through without a word against it and was signed promptly by the Governor, so if we have trouble in the future with foot and mouth disease—and I hope we won't—if we come to appraising animals, they will be appraised at their full value and the State will pay whatever it agrees to pay. The State did not set aside a certain sum of money to pay indemnities; if we get into new trouble—fortunately the last outbreak occurred just as the Legislature convened and we could get our money promptly, but if that had occurred a year later, the farmers would have had to wait a year until the Legislature convened and that would have put the farmers in very bad financial condition. Some states have set aside a certain sum of money to meet these emergencies; Pennsylvania did not do so, but I feel that we will have very

little trouble in the future in convincing our people that if the state makes a promise that it will try to pay for calamities of that kind, it will make good, because it has settled fully for two out-breaks now and I think people generally have a good bit of confidence in what the State will do.

I don't know that there is anything more to say about foot-and-mouth disease just at present. There are a great many things that could be said about it; there are some other diseases that you are probably as much interested in now as foot and mouth disease—something in reference to tuberculosis. It was necessary for us to use up so much of our money on foot-and-mouth disease, \$625,000—that we had to change our plan a little in handling tuberculosis. Up to last July, we always arranged to pay some indemnity for cattle that were condemned for tuberculosis. They were appraised under the same plan as we appraise in foot-and-mouth disease, and we could pay \$40. for a non-registered animal or \$70. for a registered animal, and we could pay them that indemnity, but on account of the money we used up for foot- and- mouth disease and our not being able to get any more from the Legislature, we had to cut out the indemnity for cattle out of this appropriation. Some of you may think that is an injustice and I am rather surprised myself to find that so many of our farmers are keeping on with the tuberculin test although they get nothing for the animal destroyed except what they get after slaughtering from the butcher, for the offal, hide, etc.

In reference to contagious abortion—that is not a reportable disease; the Board is not compelled by law to handle contagious abortion, but from the letters received from our people in the State, there is no disease that the breeders are so much interested in as they are in abortion. Now we have been trying to do a little work in it, but I do not blame you if you think it has amounted to nothing; in fact we have a pretty hard proposition there in knowing what to recommend in reference to abortion and sterility in dairy cattle, and we do not have very much trouble with that subject in other species of animals, but in nearly every mail we have a few letters from somebody who wants to know what is to be done for abortion and sterility, and we have been recommending them to isolate their animals and use local douches, etc. of antiseptics, and I do not know whether much has been accomplished in that line or not. I doubt if it pays a man to bother with it. As far as I can see at present, I think there is hope of doing something in pure bred herds, where they want to raise calves, especially. I believe that there is something that can be done, but it is nothing that you can do yourselves yet and I doubt if it will be anything you can do for a good while in the future. I do know of men that can do something for that kind of condition, and at the present time the Board is trying to make an effort to have some men trained to go out on cases of that kind and do something for the herd owners at the expense of the state, to demonstrate that it is possible to accomplish something. At the present time a herd owner does not feel justified in paying for services when he don't believe there is going to be any results obtained from it, and I do not recommend you to do it until we can demonstrate to you that it can be done properly. I will be glad then if you will be interested in it,

but as far as native herds are concerned, I doubt if it is worth bothering with; take your chances and put up with it as you have done in the past.

Hog cholera has not been so bad as in other years. I think the restrictions we had on the foot-and-mouth disease, disinfecting cars, cleaning up the shipping station and preventing shipments, to some extent, from other states, had a very good influence on hog cholera. We are still using the serum treatment and the quarantine in handling the disease, and where the disease is reported promptly, I think we have very good results. I think in any herd of hogs if the owner watches the herd carefully and reports the disease promptly and has it attended to with vaccination, I think there is very little excuse for a man losing very much from hog cholera. The trouble comes by not recognizing the disease soon enough and by delaying the treatment too long. There will be some losses the best you can manage, but if you are prompt in reporting the disease, if you treat it promptly, your losses will not be very heavy. I don't know that there is anything else unless you want to ask some questions about the work. I feel that it is the purpose of all the departments of the State to take citizens into their confidence more in reference to doing work in the future. We do the work the best we can, we do not pretend to know it all, we are ready for suggestions at any time, and if any of you know how work can be done better and how better results can be obtained, we are glad to receive suggestions at any time, either by letter or in meetings of this kind, and if any of you have any questions to ask, I will be glad to answer them if I can. If not, I wish to thank you for your attention.

The CHAIRMAN: Is there any discussion of this report? If not, if there is no objection, the report will be received and included in the proceedings.

MR. MATTHEW RODGERS: The Executive Committee are now ready to report.

The Executive Committee then presented the following report of appointments for the coming year: (See page 5).

On motion of Mr. Killam, the report was received and adopted and placed on file.

The CHAIRMAN: The next report on our program is that of the Committee on Dairy and Dairy Products, Mr. B. Frank Wambold, Chairman.

Mr. Wambold then submitted the following report:

REPORT OF COMMITTEE ON DAIRY AND DAIRY PRODUCTS

By B. F. WAMBOLD, Sellersville

American livestock producers rarely, if ever, encountered more adversities in one single year than they experienced in the year 1915 just past. In the face of all misfortunes, including foot and mouth disease, together with the unsettled conditions of commerce result-

ing from the European war, still there have been evidences of the betterment of the dairyman's condition. The Cow Testing Association, co-operative buying and marketing, especially was the improvement noticed in the co-operative creamery interests which furnished the dairyman the full value of his product.

The Cow Testing Association has opened the eyes of many a dairyman and gave him a firmer foundation. When one is approached and asked to identify with himself the organization, seemingly realizing his financial ability to unite, he is very apt to suggest the name or names of his more prosperous neighbor or neighbors, whose interest might be enlisted. The Association is designed to furnish information which is worth gold to the dairyman. The poorer his herd and weaker his finances the more eager should he be to ascertain the leakage in his business and seek the information to aid him in determining which one cow or more should become the basis of his future and more profitable dairy. Many a dairyman has told me that his cow produced a bucket of milk a day—never once making mention of the size, whether an 8, 10 or 12 quart bucket. Accuracy in figures alone makes the calculation worthy of note or notice. If he could definitely state that his cow produces 30, 40 or 50 lbs. daily, how much more satisfactory? And, if at the end of the year he could supply a complete record of production of 3,000 or 8,000 lbs. with a $3\frac{1}{2}$ or 4% test, what an advantage and satisfaction indeed.

This can be readily done and with a small outlay. A milk scale, a sheet-paper and a Babcock tester together with a few spare moments of his time would be the equipment. He will, however, tell you that he has no time but he could well afford to take the time if he would eliminate the unprofitable and thus become the gainer financially. True, indeed, it is that many obstacles confront the dairyman which may more readily be overcome in other lines of business.

The luring wages and comforts of the city and at this time the munition plants entice away the farmer's boy from the farm to take a hand in the manufacture of shot and shell to kill the soldier of other countries while the poor babies in foreign lands are crying aloud for milk to satisfy their hungry stomachs and the farmers' sons in our country are maimed or possibly killed in the twinkling of an eye. All this has a tendency to decrease production, for there is no line of employment which calls for more competent and efficient labor.

The dairyman must ever be wide awake and on his guard for 365 days in the year if he would succeed. The *Cow* is at times termed a *Machine*, which name, in my humble judgment and estimation, is false and wrong, giving an entirely erroneous conception of the animal which I personally hold in higher esteem and regard.

No other animal is more ready and willing to respond to kindly treatment than the *Cow* and will show returns for same in dollars and cents in her product. Have you ever, as a dairyman, tried to remove the dust from her back with the milkstool in angry passion before milking? If so, use the scale afterwards and this first operation will convince you that it was a costly one. On the other hand use the curry comb and brush and then the scale to note the profit ac-

cruing from this operation. Remember that the cow has life and her sensitive nerves readily contract and relax which is not the case with the nerveless machine.

If the cow throughout her lifetime from birth to the gambol were treated according to her real needs and wants, we certainly would have more profitable dairies and better diarymen, better farmers and farms, and larger crops too. Here is the secret to meet the appealing argument of the fertilizer agent when you can produce as evidence her profitable by-product—the indispensable *manure*. I might at length refer to other important matters in the dairy and to the dairyman, viz, sanitation, equipment and disposal of the dairy product. These are very frequently neglected or overlooked by the dairyman as well as the State and all this tends to decrease the consumption of the dairy product.

“The High Cost of Living” is the cry to-day. Place the dairy product side by side with other necessities of life—tabulate and note results. The public press and medical fraternity have laid the cause at the feet of the cow and her products in case of epidemics. In my home town an epidemic of typhoid broke out last year, and ‘milk infection’ was the immediate outcry, but no one made mention of the filthy alleys containing garbage which is ever the sweet prey of the dangerous *Fly*. The sewage disposal plant, often discharging its filth into the near-by stream, went unnoticed. The State should see to proper inspection and resort to rigid measures to compel the dairymen to produce a clean article, for he must often compete with the one who does not always live up to the requirements of the law.

I made an effort to secure statistics from both the State and Federal Departments for the year just closed, but was unable to gather any, hence the Committee is obliged to report without the usual statistics, ordinarily so valuable.

Let us hope, by way of conclusion, that the Committee did not fail to impress upon this body the great importance of the dairy industry and its products so as to build up our soil condition and the health of the nation, realizing fully that the dairy product furnishes the nourishment of mankind from the cradle to the grave.

The CHAIRMAN: Is there any discussion on this report?

MR. DeWITT: Tioga county has more creameries and more money invested in creameries, I think, than any other county in the State. What I may say I do not wish people to think is a thing that particularly belongs to Tioga county; but I wish to say it to warn you fellows who have some little private institutions of your own and some creameries, some skim milk stations and some cheese factories of your own, not to be too free to give them up to large corporations who will seek to destroy your little plants and build up a plant of their own and then you are at their mercy. Such is the situation that confronts the dairymen of our county today. Gentlemen, there was a time when we had, all over that county, small institutions like that I have been telling you about. We had small creameries run by the farmers who had consolidated themselves, a few of them, to make their own butter; cheese factories which had consolidated in the same way—a few of the farmers had come together and built some cheese factories and made their own cheese. Just recently there was dis-

satisfaction, and not only recently, but this thing has been going on for sometime. About 15 years ago some corporations crept in there and set up a skimming station, a butter factory, a powdered milk factory, two or three milk condenseries, and some of the patrons of those are not just satisfied with the treatment they have been receiving. They held a meeting just the other day in one of the localities where I live, and in fact the milk from any farm goes to one of these corporations, and they wished to have a talk, as the farmers, I think, were entitled to have a talk with those people who were running this factory or condensery. They did not appear upon the scene, but told them "If you are not satisfied with our usages go somewhere else."

It reminds me of the fellow that died. He went to the good place and he looked the books over and did not find himself recorded there; finally he went down to the other place and they didn't find his name recorded there and told him to go. He asked, "Where will I go?" They said, "I don't care where you go, you ought to go back where you came from." Now here is what I wish to tell you men who are interested in the dairy business, that they had our little creamery, they had our little skimming station and they had our cheese factory all destroyed; we have nothing; we are just simply at their mercy, and now the question that arises is to get those men together again and try to get them together so that we can get our milk into another channel of being manufactured.

I say this to you fellows who are dairymen. Some of you care nothing about it because you are not dairymen, but I want to say to you right now that those fellows in the western end of the State and in the western end of Tioga county feel very much hurt and one of the biggest condenseries in the world is that doing business at the county seat or near Wellsboro, and the other day the proprietors of the institution made the price to them for the year with a 5% reduction. There is nothing that you know of or I know of to warrant that reduction at this particular time, but their little factories were all gone and they simply had them at their mercy.

One young man told me the other day—to show you furthermore how sometimes these things are run—that he patronized the station, this factory, and he has been at the State College and understands the testing of milk as well as their man who does the testing for them. He took his milk to the factory and when they took out the sample for a test, he had them to take out a sample for him to test, also; there could absolutely be no mistake, and when the test was given him by the factory and he compared his test with it, they differed some 6 points. He went back to them and told them "I know that I am absolutely right; I am perfectly willing that you should take a sample of the milk, if you are not satisfied, and send it to the State College or any other place, and I am perfectly willing to abide by the decision of anybody who is competent to make this test." They simply said "If you are not satisfied with our test, go somewhere else; we are doing business here; neither the State College nor anybody else is doing it for us." Now, gentlemen, what I have said, I have said particularly for you people who may be thinking of giving all you have got in the dairy line into the hands of some other person to control; don't you do it.

MR. HUTCHISON: Mr. Chairman, we have with us today a very distinguished farmer from Lebanon county. He has been sitting over here listening very attentively and I know you people will be delighted to hear him, the Hon. Henry Houck, the Sunshine of Pennsylvania.

MR. HOUCK: I am just going to answer that invitation by saying that I am here and am very much interested; but I am obliged to leave on the train in a very short time, and besides, I do not want to interrupt this very interesting discussion that you have just had. Please excuse me at this time; I am obliged to Brother Hutchison. I fixed this up before I came in, to be called on, and am much obliged.

(There were calls for Dr. Sparks.)

ADDRESS OF DR. SPARKS

I can only say that I am sure everyone interested in agriculture is interested in getting the most out of the State's money which is appropriated for the various lines of agriculture. I know that you are all interested in the present interest which is taken by the Governor of the Commonwealth and the Secretary of Agriculture and those who are charged with the administration of the School of Agriculture at Pennsylvania State College, to so harmonize these factors of the State Government that the money which is expended shall bring the largest returns. No one of us would voluntarily keep two teams to do the work on the farm which one team could do, and we all realize the necessity of making a proper adjustment between the work to be carried on by the School of Agriculture at the College and the work to be carried on by the Department of Agriculture at Harrisburg. That is the task the Governor and Secretary have set themselves to do, to divide the line, as I understand it, by an arbitrary division which shall say that such work as you have had more this morning, with Dr. Marshall this afternoon, and others for proper protection for the people, the protection of stock and the protection of the materials you buy from adulteration—all that is the great work which the Department of Agriculture has to do, and that the work of instruction, of ascertaining information through the experiment station, of carrying that information to the people, better methods, more economical ways of doing things on the farm—that that belongs to the College; and they are trying to differentiate and divide the work in precisely that way, so that the people will get the largest return for the expenditure of their money. That is the thing we are all interested in, and that is the great work we are trying to do at the present time, and I know that no one more highly appreciates this and is more deeply interested than the State Board of Agriculture itself. And I want to say that we are trying, at the College, to carry on the work for the best interests of the people, trying to ascertain the facts through our various extension agencies made possible by this Smith-Lever Bill, we are able to carry that out in a way to give increased production and with increased production comes increased prosperity and with increased prosperity comes happiness for the people of the State. Thank you. (Applause).

The CHAIRMAN: I believe there is some difference of opinion as to how this should be disseminated, but time will not permit us to call anybody else to talk on this question now, and we will have the report of the Committee on Fertilizers, by F. S. Brong.

Mr. Brong then submitted the following report:

REPORT OF COMMITTEE ON COMMERCIAL FERTILIZERS.

By F. S. BRONG, *Chairman*

There is not another single item of expense for which the Pennsylvania farmer spends so much hard cash as for commercial fertilizer. This report is in the interest of that farmer. Let it be remembered that we are not talking about regular truck farmers or other highly specialized producers, though we believe in a general way these recommendations will also apply to them.

The first commercial fertilizer of which I have any recollection was crushed bone or bone meal, which was closely followed by acid phosphate and then by one after another of all the various combinations that high salaried officers in fertilizer factories could create. If we can take their word for it there are now nearly two thousand brands, each one better than the other, from which the farmer can take his choice.

Commercial fertilizers are designed to supply any one, or two, or all three of the plant food constituents generally conceded to be likely to be lacking in available form in ordinary soils, viz: nitrogen, phosphorus and potash. The nitrogen for the fertilizer may be derived either from a mineral, a vegetable or animal product. It may be in a form of immediate availability for plant use, or it may be slowly available, or it may be in such condition that scarcely five per cent. of it can be used by the plants in any one season. Again certain products carrying nitrogen are alkaline in their nature while others are neutral, and still others decidedly acid. In a somewhat less degree the same may be said of the materials from which phosphorus and potash are derived.

I believe that up to date we have missed the mark in our legislation for fertilizer control. We have taken it for granted that the matter of availability was all the farmer needed to know in regard to the fertilizer he spent his money for. Whether it was of mineral, animal or vegetable origin, whether it was acid, alkaline, or neutral in its chemical effect on the soil, these are things we have taken for granted the farmer need not know. Whatever we may have thought, or whatever fertilizer representatives may have been able to persuade legislatures to believe, the fact remains that these things are vital to the farmer.

Everything the farmer sells is regulated by law. When he sells a bushel of potatoes or apples he is required to give sixty or forty-five pounds, respectively, although it is scarcely possible ordinarily to heap this weight on a bushel measure. If he sells dairy products a close inquiry is made as to what he fed his cows, and as to the cut of

dress of the person who does the milking. If he sells wheat he may not deliver rye to the purchaser. But when it comes to purchasing that which may mean success or failure for his year's work the legislature turns the farmer over to the tender mercies of the fertilizer companies.

During the year 1915, fully 33,000 tons of fertilizers, in bags, were sold to the farmers of the State at a cost to them of \$8,500,000, not more than \$4,000,000 representing cost of material. The other \$4,500,000 being composed in salaries to the officers of fertilizer companies, dividends, salesmen's commissions, mixing and bagging goods, office expenses, etc. The source of European potash having been almost entirely cut off from the result of preparedness on the other side of the pond, has resulted in one year in increasing the use of acid phosphate about 250 per cent. and raising the price of this American staple about 50 per cent.

About ten or twelve years ago before a local farmers' institute, the writer of this report made the statement that the ordinary grain farmer could not afford to depend on the nitrogen in commercial fertilizer to grow his crops. At the present prices of acidulated phosphorus and water soluble potash, I now unhesitatingly put these two elements in the same class. In other words, under present conditions the ordinary farmer cannot afford to use the product of the fertilizer trust.

To this general rule I would note a single exception. To increase production without the direct use of commercial fertilizers on a farm accustomed to their use is not an easy task. On ninety-nine out of every one hundred acres in Pennsylvania the first thing, and often the only one that is needed to bring up the crop producing ability is humus. To get the organic material out of which we make humus grow a succession of leguminous crops and work the full crops into the soil. To increase this growth it may be profitable under most conditions to apply some water soluble fertilizers.

When the soil is being filled with the various growths of legumes it is also being supplied with nitrogen. Nitrogen is the form that nature provided for plant growth from the beginning. In the breaking down of the organic structure of the plants in the soil the almost exhaustless store of potash is touched for all present needs. On many soils we believe the use of floats or finely ground Tennessee Phosphate Rock direct from the mine to the farm will pay in connection with the above treatment.

Availability. What sins have been committed in thy name! Instead of assisting nature to grow our crops in nature's way, we have depended on the factory made nostrums to feed our crops. The result is that we have so depleted the organic matter in our soils that if it does not rain for eight or ten days during the growing season we become panic stricken. With a little available plant food we have stimulated the soil to over exertion and the succeeding crops show the reaction. Availability. To get it, fertilizer concerns will gather up any old thing with an acid to break down the organic structure, and then use it in complete fertilizers. In nature, the breaking down of the organic structure of plants or animal products in the soil results in bacterial action and is of very great importance in its

relation to plant growth. Even bone meal, animal tankage, and ground fish are now often aciduated to make them available. The fertilizer concerns do it for a price; but the farmer who uses these products should have his sanity inquired into.

It is my firm conviction that it is just as great an offence against morality to swindle a farmer as it is to goldbrick a mason. It is not my desire to ask special legislation for the farmers' uplift. He would resent that. All he looks for is simple, old fashioned justice. The fertilizer companies boast that they can and do use materials in their fertilizer against the laws of the State. I would have the legislature rewrite those laws. In addition to the present requirement of the per cent. of available nitrogen, phosphoric acid and potash printed on the bag, there should also appear the name of the material or materials from which the different elements have been derived. In the case of organic material the law should require the statement as to whether the organic structure remains or has been broken down by the use of acids or other chemical action. The condition of the contents of the bag as to acidity could be indicated by one of three words; Neutral, Acid or Alkaline.

If proper penalties are provided,—and it is absolutely essential that there should be,—for those who would defy the law, these requirements could be easily enforced by the Department. Then would the farmer know what he was putting into his soil and Pennsylvania agriculture would take a long step in advance.

The CHAIRMAN: Is there any discussion of this interesting report?

MR. J. ALDUS HERR: I would like to add a word to Brother Brong's talk on fertilizers or his report on fertilizers. I think that the sooner the average cereal farmer becomes aware of the fact that his soil is deficient in humus, the better for him. There isn't any one element that the average soil of Pennsylvania is so deficient as that of humus. I will prove the assertion by this little illustration: You tear down an ordinary line fence, if you please; remove that; you have added nothing to that soil with the exception of weeds probably if you mowed them they decayed there, and grasses have rotted and reverted back to the soil; you have added no lime, no commercial fertilizer of any kind. Put in any crop you wish, and I venture the assertion you will get good results. What have you done? You have done nothing but change the mechanical condition of that soil; you have changed the respective powers of that soil so that it holds water and moisture for use when the plant is ready to take it, and there isn't any one thing in eastern Pennsylvania so detrimental to growing crops as our pasture system, we pasture everything off of our ground and leave it bare, exposed to the bleaching sun, and the result is that it becomes lifeless.

I could show you an illustration in our neighborhood; only two miles from me a gentleman has 13 acres of ground on which he grows sweet corn. He has 30 or 40 acres grown by his neighbor; at the last cultivation of his corn he sows grass seed; one year he grows corn and the next year grass, grass and corn alternately, and every year he plows down the sod, and a more fertile piece of ground I have

never seen, and the nearer we can get crops in rotation that way, the less fertilizer we will need to purchase. I will venture that assertion.

MR. BOND: I had formed a resolution that I would not say a word at this meeting; but there is one thing I want to call to mind. For 25 years I have heard about the average farmer, what he can afford to do and what he cannot. I want somebody to explain what is the average farmer? 80% is the average farmer; they cannot afford to do something and cannot afford without doing it. I want to know what constitutes an average farmer.

The CHAIRMAN: The Bureau in charge of the Compensation Act has pretty well defined it's opinion who the average farmer is. The bill which recently passed exempting the farmers from the provisions of that act exempted agriculture, as I understood it; it would not have passed if it had not done so, but the commission or the Bureau in charge of that act, in carrying out its provisions, have made the average farmer a very minute creature; in fact, any man having an orchard to some extent is not a farmer; he will have to pay tribute to the insurance companies for his employees.

PROF. SURFACE: That includes also dairying and truck gardening and a number of other things that are branches of agriculture.

The CHAIRMAN: And the Compensation Act will apply to poultrymen also. If a fellow gets scared, a hen might peck him, he is in danger of bumping his head, or something of that kind, he will have to be insured; and the orchard man will have to be insured.

PROF. SURFACE: Truck gardeners and market gardeners.

The CHAIRMAN: Yes, even the minister, I believe, will be in danger of a chicken bone and have to be insured. In this discussion there has nothing been said about any cheap source of potash. I would like to call on Mr. Campbell, of Crawford county, to give us his idea.

MR. CAMPBELL: I was not thinking of saying anything. There are a good many farmers in Pennsylvania and I know that in north-western Pennsylvania with the wonderful inert stores of potash that we have in those glaciated soils up there, if we make use of and save what we have got, we do not need any, I don't need any on my farm, I use what I have got and I use it by having concrete floors in the barn that have no auger holes in them. A good many fellows in our county haven't got them yet, and I know those fellows are going to the greatest extreme in order to get potash, and I think that if the potash going down through the old barn floors of Pennsylvania could be stopped and applied to the land properly, that this apparent need of potash would very largely disappear in a good many lines of agriculture, especially. Of course there are particular lines that need extra supplies of potash, but we fellows that are crop growing and doing general farming can very largely do away with it or the apparent need of it by using what we have got, and the more I farm and the longer I farm and the more I see of the agriculture of the Eastern and Central United States, the more I'm inclined to believe that that

same thing might be said with regard to some other of our fertilizers ingredients that we have been setting such store by in past years.

We farmers too many of us have got a one sided idea of the need of more plant food in the soil, because we fellows that have been talking in farmers' institutes and writing for agricultural journals and going out and handing out information that the farmers have been trying to apply, have put too much emphasis on the need of more plant food in the soil, and the longer I farm, as I say rightly, the less I see of that need, even where we are not applying very much, and I know the day is going to come and has come already, on some of our land, that we are not going to use any commercial fertilizer of any kind and the land's producing better crops than it ever produced before. (Applause).

I like to talk about things permanent, and the most permanent agriculture that the world knows to-day is to be found in China and Japan, an agriculture that has been maintained for four thousand years; before Leibig invented chemical fertilizers, they farmed that land and to-day the land is supporting a greater population and I believe producing greater crops than on any other part of the earth, and it was farmed four thousand years before chemical fertilizer was invented and is the oldest example of agriculture the world knows to-day; and if that is true, permanent agriculture in this country can be established on somewhat the same basis, the basis Brother Herr back there spoke about a while ago. Now I am not going to talk, that is not part of my business in these meetings; I do too much of that in the State of Pennsylvania anyhow, as a lot of you fellows know.

MR. SCHULTZ: I am a fertilizer manufacturer—

The CHAIRMAN: We are well aware of that.

MR. SCHULTZ: Yes, and it seems to me that Mr. Brong was gunning for the fertilizer manufacturer, and that reminds me of a little story if I am allowed to tell it. Years ago I lived in the State of Florida, and one day I was out there gunning for squirrels, and I was in the pine woods and those fox squirrels were right at the very top of those trees and I was banging away at them and a friend was with me. I didn't get any, but this friend said this: "Mr. Schultz, just you keep at it, it's fun for you and it don't hurt the squirrels."

The CHAIRMAN: If there is no further discussion, we will take up the report on Wool and Textile Fibres, by Mr. S. C. George.

Mr. George then presented the following report:

REPORT OF COMMITTEE ON WOOL AND TEXTILE FIBRES

By MR. S. C. GEORGE, *Chairman*

Mr. Chairman and Members of the State Board of Agriculture: In attempting to report on this subject, I feel it is too difficult for one of my ability or experience to cope with; but never wishing to

shirk a task when it is imposed upon me, I shall make the endeavor, feeling that he who makes the effort is the one who is rewarded, rather than they who hear it read.

While the subject is Wool and Textile Fibres, yet it must be treated in a more general way: The animal, its value for food, its offspring, its habits, danger from enemies as well as for its fleece.

THE ANIMAL

The sheep must first be considered. Does anything on the farm appeal so much to the farmer and his boys as a flock of fine sheep? The innocence of the young lamb, the gentleness of the grown sheep, the almost human instinct of the mother when caring for her young, and even the more vigorous efforts of the male to protect the flock from enemies. Even his attack upon the shepherd during an unwary moment, and arousing his ire for the time is soon forgotten in the large fleece he will yield at shearing, or the sturdy lambs that will be seen skipping on the hillside in the gentle springtime.

Where sheep originated is a question difficult to answer. They are the first of the animals domesticated by man, and reasonably so, since they supply the two principal wants of the barbarian, food and clothing. They are found in every country, not entirely savage, from the Arctic to the Torrid Zones.

There are many distinct varieties of sheep; some valuable for their wool, some for their flesh, and others are dual purpose, producing a good fleece and still have a fine carcass. The selection of a flock will therefore depend upon the purpose for which they are kept. If the production of wool is the principal aim, then individuals of the wool breeds should be secured. But the flesh of the sheep has become so well known as an article of food that it ranks high today as one of the best of meats on the market; not only in quality but in price. Some years ago it was contended by certain consumers that the flesh tasted from the wool, but the skillful butcher can satisfy anyone that this is a fallacy. Hence when the flesh is good for food and the wool for garments and cloth, one of the medium wool breeds should be selected.

Among the more prominent breeds are the Leicesters, Cotswolds, Southdowns, the Lincolns, Oxfords, Shropshires and Merinos. The Lincoln sheep were first imported into the United States in 1835. The Cotswold in 1832. The breeding of the Merinos was begun by Mr. Atwood in 1813. In any case, whatever may be the breed, it is important that strong, vigorous animals be secured. Sheep, like other animals, should have good size.

In starting a flock of sheep the inexperienced man should begin with a small number, probably twelve or fifteen ewes. We have found on our farm that the Merino ewe was a very profitable one to keep. A little harder to winter, not being quite so hardy as some of the other breeds but not so hard to summer not requiring so much range, not so likely to jump and not so liable to disease, and when bred to a ram of some of the open woolled breeds, the lambs were large and good sellers, never failing to make a good profit. Quoting from the Secretary of the Delaine Merinos Association: "The importance of a better fleece is the leading question of today among breeders who are trying to produce better Merinos. Wool of a higher

grade, a quality from which the higher class of fabrics can be made. Evenness of fleece and fineness of fibre are two things to be considered." He says further, that the Tasmanian fleece grown on an island near Australia is our strongest competitor.

Not only is the fibre to be considered but the oil and difference in shrinking from scouring. The preparation of wool is very important. Several years ago, all sheep were driven to the creek, or a dam made in the meadow brook on the farm, and were washed before being sheared. When the owner did this himself he could have reasonably clean wool, but when some one else had to be employed to do the work it was not so well done. Then when time was given for the wool to dry on the sheep before being shorn, it accumulated a good deal of dirt. Some was tub washed; that is, after being shorn, was washed by hand and dried in the sun, and some was shorn and sold without being washed. In this way there were too many grades and too many prices, the washed wool not being of the same quality. Now no one washes his sheep nor his wool, but all is shorn and sold as it comes from the sheep.

It is a good plan with breeding ewes to tag them; that is to clip away the locks from the hind legs and udder, before lambing time. This relieves danger of the accumulation of filth and the breeding of worms that often results from the neglect of this. This wool should be kept by itself and sold as such.

PROFIT IN SHEEP

That sheep are one of the best money makers on the farm cannot be denied. Our own experience has proven to us that with a flock of sheep, after counting off one-half for feed and care, as the share man usually gets, has yielded a profit of 33½% on our worst year, on the money invested, while better years have given us 70%. I wish to quote from a clipping in our own county paper. The gentleman named is my own neighbor of about three miles distant: "D. W. Anderson, of Parkwood, a progressive farmer, has demonstrated to his own satisfaction, that there is money in sheep in this country. He brought 55 lambs to Indiana on Thursday. They weighed 5,200 lbs. or nearly 95 pounds each and brought \$7.00 per head. Half of the number were twin lambs. Counting the wool secured from the ewes which raised the lambs, each ewe has brought about \$10.00 this summer. The entire flock has made Mr. Anderson more than a dollar a day for the past four years."

The price of wool is stronger at the present time.

Great Britain has proclaimed further, though not definite limits on the exportation of wools from her colonies. Foreign markets are stronger than in the recent past, while prices are higher than a year ago in Australia, Africa and South America. The advance amounting to 50 to 75 per cent. on most grades. Even if prices were not higher on other continents the advance on ocean rates would add to the cost of wools here. Ocean transportation is at a premium these days, and there is no commerce commission to prevent vessel owners from charging all they can get. As a natural result of these conditions and the big orders now in hands of the mills our wool market has shown strength in recent weeks, and if the present war continues the chances are in favor of the producer.

SOME DIFFICULTIES

The old adage that a change of pasture is good for sheep is not only true but it is essential. Sheep are great scavengers, they clean up many of the weeds on the farm and along the fence rows. Many claim that they will live on these and require very little attention; but it is evident that the sheep, like other animals, respond to good care and treatment, and the better they are cared for the more profitable they are. A change of pasture is more essential than a very large range. Therefore it is better to have the pasture divided into fields and change the flock from one to another every week or ten days than to allow them to roam over the whole pasture at will. And here comes in the fence problem. Fencing material is so scarce on the average farm, and timber so high in price that the farmer can hardly afford to use it, and the material we buy is scarcely worth putting up. Here, again the war looms up. Galvanizing material is so expensive and difficult to get that much inferior wire is on the market. Sheep require a closer fence than most other stock. Hence this is one of the problems that is hard of solution. Other animals may be kept in close quarters but not so with the sheep.

ENEMIES

The worst enemy the sheep man has has to contend with, especially the one who lives near a mining district, is the much discussed or cursed dog. According to statistics, compiled by L. H. Wible, Statistician of the Department of Agriculture, the sheep killed by dogs in 1913 were 6,393 and the number injured were 4,845. The average price paid for sheep killed was \$6.35 and for injured \$2.85 or a total of \$54,322.70. Now how many dogs would it take to be worth that much money? We think there is not one dog in a thousand that is worth the price of the lead it would take to put him out of existence.

The number of dogs killed were 1,419 and this cost the State \$1,719.56. The amount expended for the payment of horses bitten by mad dogs was \$2,593.37 while the amount expended for dog tags was \$2,813.31.

We find further that the number of sheep in Pennsylvania declined from 1,531,066 in 1900 to 883,072 in 1910, a decline of 43%. From one of the leading sheep states of the east, we have fallen away until the last census reports that only 11.6% of our farmers report sheep among their livestock.

Other causes may enter into this, such as tariff tinkering, and diseases of sheep, also the fence problem of which I have already spoken, but the dog is the principal cause.

In Washington county, the great sheep growing county of the State, last year the funds for paying sheep claims were exhausted, and the claims were three years in advance of payment. It was further reported that the number of dogs in that county was one to every three taxables, while some of the towns or villages did not report so many, it was believed that the assessors were negligent. A friend in Cambria county informs me that when a farmer undertook to rid his farm of dogs that the dog owners burned his barn to the ground.

Now, how can sheep be raised under such conditions? We are not going to propose any dog law; but we do think no foreigner should be allowed to keep a dog, and no dog, owned by any person, should have more privilege than any other domestic animal.

The CHAIRMAN: Is there any discussion of this report?

MR. DEWITT: I think that this report is one of the best reports that has ever been read before the Board since I have been a member, and he winds up with the same argument that every report has wound up with, and that is the *dog*, and the last legislature ought to be ashamed of itself on account of the Dog Law that is put upon the statute books of this Commonwealth, with all the different strings and means to prevent putting that law into effect. You all are perhaps more conversant with the law than I am, but the other day I said to the assessor, who, as you know, is under obligations to assess every dog and to carry a tag with him and know that the tag is put on and collect a fee from the man who has the dog—I said to him, “How did you make it?” He said, “I found thirty dogs up in the upper end of the town that nobody owns;” A small village like ours, fifteen hundred or sixteen hundred inhabitants. There should be some means, gentlemen, taken at the next legislature to get rid of these dogs—what expression did he use—these cussed dogs, in the State. Tioga county has hundreds of acres of land to-day that are not being used, but which were formerly used, just for the reason that dogs have run the sheep out of our county, and not only out of our county, but we hear the same thing every time people get together, and we, as representatives from each county of the State, are powerless to have a law passed to protect a product of the farm, that there is nothing so easy to get money out of as sheep, for I used to keep anywhere from one hundred to a hundred and fifty sheep myself. I hope when the next legislature meets they will not be so afraid of the labor unions of this Commonwealth and that they will pass a law driving the dogs out of the country, especially those that have no owners.

A Member: The Dog Law reminds me that the member of the legislature that introduced that bill was drunk—I know some of them were. One of the provisions under which a dog becomes an outlaw is the most inconsistent thing; one provision is that you daren’t shoot a dog for chewing up game out of season that wears a tag with his master’s name and post-office address on the plate on his collar, and you have got to notify that man once before you dare kill his dog. I have never been able to notify the owner because I couldn’t catch his dog. I have to shoot the dog to read the name on his tag. I can read the name, but first I have to fix the dog so I can read it.

MR. GEORGE: As you know and as the gentleman has said, they are required to carry those tags along and collect that tax as soon as they assess the dog. Well it has been found in our county almost impossible to do that. Our Commissioners have made a ruling recently, since the new Board went in—they took their seats at the beginning of the year, and they extended the time, they found that quite a number of these licenses were not paid; they extended the

time, I believe, to the twenty-fifth of this month allowing them an increase of 8% on the regular fee on the dog tax, that to go to the collector of the dog tax; they gave them that much time and added 8% to it, and still it is not going to solve the dog problem; in our county it has driven the sheep out of the county and some persons would call them harder names than I used in my report.

MR. SCHULTZ: It seems to me that if we cannot get the laws we want, it is our own fault. I feel more convinced on that point than I ever did. But I must go back to the fertilizer business. Last year we formulated a bill to be enacted into law protecting the farmer along commercial fertilizer lines, which was a good bill and it ought to have been made into law and it was not. Why wasn't it? It was dropped simply because the farmer was not up to his job; the farmer originated the bill and put it in the hands of the legislature, then forgot it.

What did the fertilizer people do? I think that bill that was started through my agitation in this body here, in fact I know it was, and it was a good one. What did the fertilizer people do? Just before the bill was up, I got a notice that I should be at Harrisburg on a certain day in the interest of commercial fertilizers, and it was a pretty strong notice, and when I got there they asked me to go before the legislature to undo that very bill. I couldn't do that, and yet I couldn't go before the legislature and defend it because I had no right to get the animosity of all the fertilizer people on top of me; I had no right to risk my business. All the big companies were represented there and they simply took hold of that bill and that was the last you heard about it. Now if the farmers had been there—the people that put those men into office to enact those laws—and told them what they wanted and insisted on it, they would have got it passed, there is no question about that, and it is no use for us to come here and talk those things over and forget them; at the vital point we fall down, and that is a mistake.

MR. R. L. MUNCE: I represent Washington county. I don't know that I have any rights or privileges on the floor; I am not a member of your Association. I am sorry to say, but I am mighty glad, as President of the Sheep Breeders' and Wool Growers' Association of Pennsylvania, to be with you. We are trying to put the industry again on its feet as it was in years gone by. I know there is a disposition on the part of our Governor, if you heard his statement this morning, and also I talked to-day with the Secretary of Agriculture, to bring about this sheep growing industry in the State of Pennsylvania, and I am mighty glad to know that this body is also taking note of the importance of the industry. I feel that you members, if you go about over the State and preach such doctrines as has been preached here by the paper read, that it is bound to do a lot of good, and I don't know of any one thing this Board of Agriculture can do that will bring more pleasure and profit to the State of Pennsylvania than to put again on the map the sheep industry of the State.

In regard to the Dog Law, of course that is one of the crying evils and one of the things we have to contend with. Three years ago I lost a hundred and forty head of sheep myself with dogs, and I

know what that means. Our county last year was fourteen thousand dollars behind in paying for her sheep lost. But I want to say to you that last year we came here to Harrisburg and there were a number of bills up in regard to legislation, and I never saw—and I have been at the business for forty years, and I would like to tell you how at both here and at Washington City, lobbying in the interests of the sheep and wool industry, and I never saw a set of men that were more disposed to do something for the sheep industry of the State of Pennsylvania than they were last year in the legislature. And, as the gentleman over there said, we did not get as much as we ought to have had because the men who are interested in that thing were not here to follow it up. The last Dog Law enacted is the best we ever had. The gentleman says something about what to do with the dogs that don't have any owners. The law provides for that, that when the tax collector or assessors goes out and issues the tag, he issues the tag to the owner and takes account of that dog and reports back to the Commissioner where he found certain dogs, and then also, in addition to that, he is required to publish a list of those who have paid their tax. Smith & Jones read that list, and his neighbor naturally looks at the list of dogs listed there to see whether certain men have paid their tax and whether their dogs are listed or not. If they are not, it is his personal duty to let the Commissioner know that that man has not listed his dogs and has not paid the license on those dogs, so it is up to each individual to see that the Commissioner is notified and at the end of thirty days it is their duty to send out the constable or the State Constabulary guards to kill those dogs.

Now the law provides for disposing of the dog that does not have any owner. Of course there are many amusing things in connection with this. I talked to an assessor not long since. He went to a Dago shanty where the man was known to have at least three dogs, and the man told him "I had three dogs, but I hung them, I don't have any dogs here!" He went to the next-door neighbor and said "How many dogs did you get from the Dago?" He said "I didn't get any, he hung his dogs." He said, "I hung those dogs all over there this morning." He started an investigation and found the three dogs hung in fertilizer sacks in a little wood-shed; so he got by. (Laughter.)

But I want to say again that I don't think you have anything that would be of more importance to the State of Pennsylvania than to foster and promote this sheep industry, and I want you to keep also after the dogs, because if we get rid of them we can do a lot, and I am glad to know that the State Board of Agriculture is paying attention to the matter and that the Secretary of Agriculture is going to give it his attention. On the twenty-third and twenty-fourth of next month, we are going to have a meeting at Pittsburgh of the State Livestock Breeders' Association, and the Dairy Union, etc., and the Pennsylvania Sheep Breeders' Association are going to have a meeting down there and I hope that some or all of you will come down and help us boost the sheep industry of Pennsylvania.

MR. KERRICK: In the county of Bradford, the Commissioners have put that law in force and have given the people until the first of February, and all dogs that are not properly tagged then are to be killed by the constable.

The CHAIRMAN: In connection with this dog question, last winter it required some courage to get up and introduce a Dog Law; a man was ridiculed all over the House; they began to bark as soon as he got up to introduce the bill. If that is the caliber of men you send to Harrisburg, and it is true that the stream does not rise higher than its source, who is to blame? We will proceed with the programme and will now have the report of the Sanitarian, Dr. S. G. Dixon, of Harrisburg.

Dr. Dixon then presented the following report.

REPORT OF SANITARIAN

By DR. SAMUEL G. DIXON

Two years ago I called your attention to Doctor Van Slyke's valuation of the loss to farmers of the United States through the waste of liquid manure; his estimate of this loss being seven hundred millions of dollars annually. I also tried to explain to you the activities of the Department of Health in purifying the waters of the State and the results which were being obtained in the saving of life, suffering and sorrow. During the two years which have elapsed since last I had the pleasure of speaking with you, this work has been continued and the death rate from water borne diseases further decreased. During these two years our stream inspectors have been out upon the watersheds making their inspections and securing the abatement of stream pollutions, among which liquid manure from barnyards plays an important part, and it is particularly along the line of conservation of our natural fertilizers that I wish to make my report to you today.

We believe that the farmers of the State are beginning to understand that when they are ordered to conserve the liquids in their barnyards and not permit them to be washed into an adjacent stream, they are not being persecuted or having hardships imposed upon them in order to save others but that not only the inhabitants of the cities and towns down stream are protected by this work but that they themselves are benefitted as well.

During the last two years over two thousand four hundred barnyard pollutions have been discovered by our inspectors and abated by the farmer. Many of these abatements are made at a very slight cost—in some instances by throwing up an embankment of earth around the yard and turning the surface drainage of the adjacent ground in another direction; in other instances by putting a down spout on the barn roof and carrying the roof drainage outside the barnyard, and in extreme instances by the construction of a concrete retaining wall. Just lately a farmer in Porter township, Clinton county, built a concrete wall around his barnyard—120 feet in length, 10 inches thick and 3 feet high in compliance with an order of abatement. When our inspector went to make his re-inspection after the wall had been built the farmer told him he would not have it away again for five times what it cost.

Pennsylvania is saving some of the seven hundred millions of waste in the United States found by Doctor Van Slyke. Prof. Snyder in his excellent book on "Soils and Fertilizers," published in 1911, tells us that a milk cow when fed a balanced ration will make from sixty to seventy pounds of manure per day of which from twenty to thirty pounds are liquid, and that when a cow is fed clover, hay, corn fodder and grain, about one-half of the nitrogen of her food is in the urine; one-fourth in the milk and the remainder in the solid excreta, hence if the solid only is collected only one-fourth of the nitrogen of the food is recovered, while if both solid and liquid are utilized, three-fourths of the nitrogen is secured. The ordinary horse produces about fifty pounds of manure per day which while by itself of questionable value, is well known to be valuable when mixed with cow manure.

An average farm with six cows and four horses will produce in the barnyard probably fifty tons of manure per annum which, in comparison with commercial fertilizer, has a cash value of about \$250. The nitrogen in commercial fertilizer represents about $\frac{1}{3}$ of its value, therefore, the nitrogen in the natural fertilizer would be worth approximately \$80 per year on the average farm. Two-thirds of this nitrogen is in the liquid manure and if this is wasted the farmer is losing at least \$50 each year, but during the last two years on 2,400 farms in the State this valuable product which two years ago was permitted to drain into the streams is being saved, representing a total saving of at least \$120,000 a year to the farmers of the State. The total cost of making the necessary improvements on these premises probably did not exceed \$20,000, and the saving to the farmers of the State in one year exceeded the total cost both to the farmer and to the State in not only conserving wasted fertilizer but in protecting streams from pollution and our people from water borne diseases. The older civilizations of Europe, and even China, in their intensive farming long ago learned the value of liquid manure, and perhaps for this reason alone and without any idea of protecting the purity of their streams or the health of their people have carefully retained this natural fertilizer and not permitted it to be wasted.

Just now all this means a greater saving to the farmer than ever before in the history of this country on account of the extremely high price of artificial fertilizer. It is very gratifying to me to be able to report that the farmers are beginning to realize the value as a fertilizer of this liquid which heretofore has been treated as a waste. I have often been asked why some of my hillside crops are irregularly streaked with dark green—it is because I have a primitive method of spraying manure water with a hogshead and a hose which does not spray the water uniformly, therefore, the vigorous stalks of wheat that have received more than their usual measure of food show this dark green color.

This is a day on conservation of our natural growth. As we look over our naked mountains we regret the waste of our timber lands. Men are spending much time and thought upon devices to utilize the waste thrown out in former years from our coal mines, and so the farmer must realize as well that in the past he has not been getting

the full value from his soil. Our farm lands must produce more if our ever increasing population is to be fed and if the soil is to feed us to must in turn be few. We must no longer waste our most valuable fertilizer. I regret to report that many of us are continuing to allow our most valuable fertilizer to be washed away. There are one thousand barnyards which have come under our notice that have not yet been improved. We hope that by another year this number may at least be greatly diminished.

The CHAIRMAN: Is there any discussion of this report? If there is no objection it will be received as a part of the proceedings. We now come to the report of the Microscopist and Hygienist, Prof. J. W. Kellogg.

Prof. Kellogg then presented the following report:

REPORT OF THE MICROSCOPIST AND HYGIENIST

By PROF. J. W. KELLOGG.

The subject matter of the report of your Hygienist and Microscopist should be, so far as possible, in keeping with the title; and as the outward appearance of our dwellings and other buildings, which should ever be pleasing to the eye, is in the nature of "hygiene for buildings," it seems fitting at this meeting of the Board to report what has thus far been accomplished in the way of properly caring for and prolonging the life of our buildings. As our bodies are in danger of destruction from disease, if not properly cared for and protected, so are the structures in which we live, house our stock and store our goods subject to a like destruction by the continual tearing down processes of nature,—if they are not kept in repair and protected by a combination of materials which we call Paint. We are all familiar with the splendid appearance of those farm buildings which are kept in repair and painted from time to time as required, as compared with those structures which are neglected in this respect and which have fallen into ruin and decay. Some buildings which are not cared for soon become in a wretched and dilapidated condition where decay has started and provide a breeding place for germs and the collection of dirt. It behooves us, therefore, to keep our buildings in repair and to protect them from the elements, if we would wish to give to our farms the appearance of cleanliness, thrift and prosperity. This is especially true in the case of our dairy and stock barns.

At the last session of the Legislature, Pennsylvania's first Paint Law was enacted which regulates the sale of Paint, Putty and Turpentine. This law became effective the first of last December; and as we have had for a number of years a good Linseed Oil Law, the Secretary of Agriculture is now authorized to keep his watchful eye on the character of all paints, oils, putties, and turpentines which are sold in the State. A few years ago one of our Specialists, in his report to this body, described the character of paints, going somewhat

into detail as to their composition and advocated that steps be taken to have such a law adopted. After a number of unsuccessful attempts, we are now gratified to report that the Department of Agriculture can have something to say as to how these painting materials shall be labeled and sold in Pennsylvania. Only a few other states have paint laws at the present time, and while our law is not as strong in its requirements as it might be, it is a step forward in constructive and necessary legislation. The law does not require the formula label or chemical composition to be placed on each can of paint, but it does require that nothing shall be placed on the label which "shall bear any statement, design or device regarding the ingredients or the substances contained therein—which shall be false or misleading in any particular." This means that hereafter mixtures of a small percentage of white lead and the balance clay, barytes or such inert material cannot be sold for "Pure White Lead." It means that diluted pigments and the many diluted colors in oil can no longer be sold in Pennsylvania for the pure and full measure articles, for from now on all painting materials which are manufactured and offered for sale must have clearly stated on the label the net weight or measure of the contents, the true name of the product and the name and address of the manufacturer or importer.

It is advisable to here call your attention to the fact that the law does not control interstate shipments of paint such as is sold by large mail order houses or retail stores where shipment is made direct to the consumer. When buying paints, therefore, it is well to bear this fact in mind as, no doubt, it would be safer to purchase paints sold in the State by reputable and responsible firms who place the name of their company on the cans and in many cases show the chemical composition of the same. Since the passage of the paint law, it has developed that quite a number of legitimate paint products were being sold which had their special and proper place in the trade and which were diluted it extended but which were labeled and sold as pure or full strength articles. This situation is interesting as it shows that we were badly in need of a paint law. Many of the manufacturers of these articles have arranged to properly label their goods and have sent many of such labels to the Department for examination. Under the provisions of the act, the Department cannot object to the sale of these half strength or extended paints and colors providing they are properly labeled to show they are extended. A ruling has been made, therefore, that these materials shall be labeled in a plain and conspicuous manner as a "Compound," therefore, when any of you gentlemen go to a supply house to purchase Pure White Lead, Pure Zinc, Pure Colors in Oil, Pure Turpentine and Putty be sure and look for the word "Compound." If you find it on the label you will then know that these materials have been "extended" as the trade call it, with varying amounts of Barytes, China Clay, Calcium Carbonate or some other "extender." As previously explained, these extended materials have their proper use in place of full strength lead, zinc and colors. For example, it is recommended by many expert painters that for an outside white paint a mixture of 75% of white lead and 25% of zinc white be used as such a paint retains its white appearance longer than if pure white lead were used. In the case of certain colors, it appears that where

it is desired to produce a certain shade or tint in a mixed paint, it is more desirable to use an extended color as it is less difficult to thoroughly mix it with the pigment and oil than is the pure full strength color.

In the case of the many mixed paints the Department can only direct that a full measure be given and that no false claims be made as to the composition. It cannot require that the ingredients be shown on the label, but it can prohibit the use of mineral oil and excessive amounts of water which have frequently been found present in large amounts in some grades of mixed paints. It is not the purpose of the Department to attempt to advise as to what kind of paint or what brand of paint should be used; but when certain paints are being illegally sold we shall not hesitate to notify you to this effect. The question of the proper kinds of paints to be used for the many different uses is a problem for the expert painter.

We propose to analyze samples of the various paints on the market and tell you of what they are composed. We have equipped a laboratory especially for this work and with the limited means at hand, we are now arranging to collect samples of these products and analyze them during the present year. Unfortunately we are handicapped at the present time by lack of sufficient funds to carry on this work as it should be done, for the reason that only \$3,000 for the fiscal period was given us to protect the consumers of this great State from receiving falsely labeled and adulterated paints. We can, however, get a splendid start and it is hoped at the next session of the Legislature sufficient funds will be given us to enforce the provisions of the new paint law in a satisfactory manner to all concerned.

The CHAIRMAN: Is there any discussion of this report? If there is no objection, it will be received as a part of the proceedings of the Board. Next comes the report of the Entomologist, Prof. H. A. Surface, of Harrisburg.

PROF. SURFACE: Mr. Chairman and Members of the Board: As I shall speak of some insects that have not been abundant or conspicuous throughout the State and cannot illustrate my address by slides and pictures. I will show some of the specimens themselves. and I would like to ask my friend Hutchison if he will kindly see that these get to the persons interested in seeing them; he is a good hand in passing bugs.

MR. HUTCHISON: I helped you kill bugs for a year.

PROF. SURFACE: You are a good hand in passing them. I will also submit photographs of some insects that have, for the past year, been very destructive in this State, and will leave them here to be examined as you wish. All of those are the red leaf beetle, that was very destructive in the northern central and western counties of the State during the past year. We have worked out his life history and I am going to give it for the first time here today. These are a popular beetle, not related to the red leaf beetle and not the same species, so I will not pass these with them, because it might lead to some confusion.

Prof Surface then submitted the following report.

REPORT OF THE ENTOMOLOGIST

By PROF. H. A. SURFACE

(a) *New Methods of Pest Suppression*

During the past year the chief advance that has been made in regard to methods of pest suppression has been along such lines as of fumigation of the soil (chiefly with carbon bisulfid) for soil-inhabiting pests, fumigation of grain during warm or temperate weather for the destruction of grain pests, spraying with a coarse spray or sprinkling with large drops of sweetened poison spray for such pests as the fruit flies (including the Railroad Worm or Apple Maggot) and the root worms of cabbage and related plants, radishes, turnips and onions.

The use of tobacco decoction with a little soap added has proven highly satisfactory for the destruction of suctorial insects, such as aphids, young plant lice, redbugs, leaf hoppers, etc., and also for mites, red spiders, etc. One ounce of tobacco extract and one quarter pound of soap in four gallons of water has given good results for such pests.

The destruction of *Lecanium* scale with lime-sulphur solution, applied thoroughly while dormant, one-third stronger than for San Jose scale, or specific gravity hydrometer test of 1.04, has been fully demonstrated, as was also the prevention of damage by the Codling moth by means of lime-sulphur spraying without the addition of arsenate of lead.

(b) *New Features of Control of Insects Generally Established*

For the scale insects nothing is better than strong lime-sulphur solution applied during the dormant season; but we have demonstrated that for the control of the *Lecanium* this material must be used one-third stronger than for the San Jose scale, or specific gravity hydrometer test of 1.04.

Altho the Codling Moth has been controlled by spraying with lime sulphur solution alone just after the blossoms fall, repeating this in two weeks, and again in two weeks after that, without the use of arsenate of lead, the formula that we recommend as best for this pest consists of one gallon and one quart of concentrated lime-sulphur solution, homemade or commercial, and one or two pounds of dry arsenate of lead, in forty-nine gallons of water.

The much-dreaded root maggots of cabbage, turnip, radish, onion etc., have been controlled by spraying with a coarse spray, or by sprinkling with drops, of sweetened poison solution of the foliage of plants before the female flies lay their eggs, so that these adult pests are killed in the process of feeding.

The prevention of borers in fruit trees by the use of lime-sulphur solution containing sediment, making about three applications per summer, as a wash or coarse spray, has been further demonstrated. One quarter ounce of arsenate of lead can be added to this with safety, but is not essential.

The Corn-ear Worm was unusually bad last year, but can be controlled by dusting with one part of dry arsenate of lead in six parts of sulphur, making about three applications at intervals of two or three days each, commencing when the silk first commences to show on the young ears of corn.

(c) *Insects Newly Introduced or Not Yet Widely Spread in Pennsylvania*

We have a report from the southern part of Clearfield county of a remarkable outbreak of the insect known as the Walking-stick (*Diaphomera femorata*). They defoliated vegetation of nearly all kinds, including fruit trees and forest trees, over an area of some acres. The dropping of their eggs on the leaves under the trees sounded like the falling of rain. These pests can be killed by arsenical spraying, or their eggs can be destroyed by burning them on the ground among the fallen leaves, where they remain exposed during the winter.

A newly introduced pest in Pennsylvania is the European Hornet (*Vespa cabro*), which did considerable damage to the peach twigs of Mr. J. A. Faust, of Mowersville, Franklin county, Pa. These worked by eating away the bark and cambium of the twig, as shown by specimen herewith submitted. This is the first report of the European Hornet in Pennsylvania, altho it is known as introduced and very destructive in the State of New York. It is possible that during its feeding period it can be destroyed by spraying with one-half ounce of arensate of lead in each gallon of water, applying this to the twigs on which it feeds. Sweetened poisoned liquid is also recommended. Its marks are conspicuous and characteristic. It makes a paper nest, as does our American hornet, but is more liable to nest in holes in trees, in the ground, or in stone heaps. Where there are evidences of its presence, as shown by injured twigs, its nest should be sought and destroyed.

The Apple Seed Chalcis has continued to be destructive in the northern part of Pennsylvania. We have worked out its life history, and know that this insect inserts an egg by means of its long ovipositor when the fruit is about the size of a robin's egg, reaching the seed in which it feeds as a young larva, develops, changes to a chrysalis and passes the winter. The fruit may hang on the tree, or fall to the ground. It bores out through the seed and fruit in the spring to produce another generation. The best possible means of suppression is to destroy all fallen fruit, and all that hangs upon the trees in winter. Pasture with pigs or sheep. This pest causes the fruit to remain very small, stunted and irregular in shape.

The Railroad Maggot was not as bad as some years, but it continued destructive in summer apples, especially sweet varieties, in the regions drained by the northern waters of the Susquehanna River. The use of a coarse poisoned sweetened spray, or drops of this liquid, on the lower limbs of trees in infested regions will destroy the insects before they lay their eggs.

The Pear Midge is spreading in the southeastern part of Pennsylvania. Hundreds of little fly larvæ or midges may be found as minute maggots in the fruit of the pear when it reaches a size as large

as the end of a man's smallest finger. The fruit swells and drops, and the pests come to maturity within it. Spraying just after the blossoms fall with tobacco decoction or soap solution, repeated in two weeks, should suppress these pests.

The Pine Shoot Moth has been found by our inspectors doing damage to pine trees in certain parts of the State where it has been introduced recently. It should be watched, and cut out and burned, or it will result in considerable loss and deformity to pine trees.

The Pear-leaf Blister-mite continues to be a serious pest to pear and apple. When the leaves commence to look as though soot had been rubbed into them in blotches, they should be sprayed once per week with tobacco decoction and soap, or with kerosene emulsion. The Angoumois Grain Moth has continued to cause much loss in the southeastern quarter of Pennsylvania. It is spreading and needs attention. Fumigation when the temperature is above 60 degrees, with one pound of carbon bisulphid for each one hundred cubic feet of space occupied by the grain, is effective.

(d) *Native Insects with Modified Habits*

It is my great pleasure to report to this Board some new and important discoveries by the Bureau of Zoology of the Pennsylvania Department of Agriculture during the past summer and fall, concerning two important insects which almost suddenly became abundant and destructive, and the habits and native food of which were not known until these investigations were made, and have not been published anywhere before this time. These insects are the Red Leaf Beetle (*Galerucella cavicollis*) and the Poplar Beetle (*Lina tremula*).

Two years ago there were a few reports of damage to the leaves of cherry and peach trees by the Red Leaf Beetle in Lycoming county. A year ago there were reports of injury by this pest in the counties adjoining Lycoming. Last summer there were reports from more than a dozen counties of northern and central Pennsylvania, that this insect was severely damaging peach and cherry trees, and in many cases attacking apple, pear, plum, and even some herbaceous or smaller cultivated plants. Dr. L. O. Howard, U. S. Entomologist, informed the writer that the native food plant and the habits of this pest were not known. We took up investigations at once, and discovered that its native food plant was the wildfire cherry (*Prunus Pennsylvanicus*).

In our investigations we found that its larva feeds only upon this plant, while the adult beetle feeds upon other trees and shrubs, as mentioned above. The adult beetles come forth in the latter part of the spring, feed upon the leaves, mate, go down the trunk of the tree to near the surface of the ground, and lay their eggs in rubbish, or on the ground, or on the bark of the trunk just above the ground. The larvae hatch and crawl up the trees to the leaves of the wild cherry on which they feed. After they become grown they come down the trees again to pupate at the surface of the soil. After they transform the adults go to the leaves to feed again, and then scatter and find protected places to pass the winter, chiefly in rubbish. Thus its life cycle is worked out showing one brood per year, and here published for the first time, with statements as to its native food habits and remedies.

The remedies are easily applied as they consist in spraying with nothing more than arsenate when either the adult beetles or the larvae are feeding. We recommend one ounce of arsenate of lead in one gallon of water. On the peach make it half as strong. The destruction of the fire cherry is also recommended to effect the destruction of this pest, as it would then be exterminated or obliged to change its larval feeding habits, if possible.

In this connection I am glad to report that our Field Assistant, Mr. H. B. Kirk, had opportunity to make observations on a closely related beetle, which likewise is not generally known. Because this pest feeds on the Aspen or Trembling Poplar (*Populus tremuloids*) we call it the Poplar Beetle (*Lina tremula*). Altho other species of poplar were near at hand this insect was found to feed only upon the poplar correctly called the Trembling Aspen. Of this beetle there is but one brood per year, with habits similar to those of the Red Leaf Beetle.

(e) *Some Insect Friends*

We must not lose sight of our beneficial insects, as there are really more species that perform services for mankind, than there are that destroy his property. For example, we well remember when the destruction of bumble-bees was thought to be the proper thing. We have known farmers to carry straw to burn their nests. Now we know that clover and allied plants are essential in building up soil fertility, and that to produce the seed of such plants the humble bee is an essential agency. Whether they be internal parasites, like the effective destroyers of the San José scale, or predaceous insects, like the Lady Bug, the Lace Wing larva, or the ground beetle or whether they be scavengers, like burying beetles and flesh flies, dragon flies destroying mosquitoes, or whether they be pollen carriers for the fertilization of blossoms, there are hundreds of insects worthy of our study and preservation.

(f) *Effects of Vertebrate Destroyers of Insects*

Attention must be called to the efficiency of birds, mammals, reptiles and amphibians as destroyers of insects. The spray pump is but a temporary palliative. Where it is possible to get these natural enemies of insects to work for us we are using Nature's method and gaining ground. Further studies convince us of the importance of recognizing and preserving our various insect enemies.

(g) *Obnoxious Bounty Laws*

One of the best known men in Pennsylvania, who is interested in the conservation of wild life, recently wrote to us that he wondered how long this State would continue to suffer from depredations of hordes of rodents and myriads of insects, because of its bounty laws, which not only permit the destruction but place a premium upon the enemies of our obnoxious creatures. Let us not take it for granted that the owls, hawks, foxes, skunks and the weasels are the enemies of the agriculturist, but rather let us comprehend readily that without the co-operation of such creatures we shall have greater difficulty and expense than ever before in making the soil yield returns for the laborer.

During the reading of the report the following discussion took place:

A Member: What is the difference between Arsenate of Lead in the paste and in the powdered form?

PROF. SURFACE: Use twice as much in the paste form. It will cost you a little more in the powdered form, but in the long run it will go further. In my own orchard work, I use the powdered form altogether.

MR. HUTCHISON: Will that kill the Club Root?

PROF. SURFACE: The Club Root is a distinct disease. I proved, on the premises of Hon. Henry L. Walton, former Speaker of the House, that mixing equal parts of sulphur and lime destroys the germ of the club root in the soil and that disease does not appear. Mix equal parts of sulphur and lime and stir a small handful of that right in the hill where you are going to set the cabbage plants. I notice my friend Mr. Bond and others watching carefully what I am saying. This is a new thing, the destroying of the root maggot on cabbage, cauliflower and related plants, and turnips, radishes, beets and onions, by a sweetened poisoned liquid, applied not as a spray, because it is so fine that it dries before the winged insect gets to it, but use Arsenate of Lead, water and molasses, from a half ounce to an ounce of Arsenate of Lead in a gallon of water, with enough molasses and stir up to sweeten it, then sprinkle it with a sprinkling can over the foliage where the insects will appear later as larvae. The adult fly of the radish maggot feeds on this material before laying its egg on the plant, and is destroyed. It has been proven very thoroughly in three different experiment stations during the past year that that is effective. I might add, while it is not entomology, that this is the best preventive of damage by rabbits that can be had. There was a gentleman here last week who heard a man from Luzerne county say that he had found it absolutely successful in preventing the gnawing of his trees by rabbits during the past three years.

A Member: How would you apply that?

PROF. SURFACE: As a dust; one quart of Arsenate of Lead to six of sulphur. Apply it as a dust. One way to do that is to take a coarse sack and put the powder in it and shake it over the plant. In the South it is applied by putting the sack on each side of a mule and having a boy ride along beating each sack with a stick.

MR. BOND: What does that worm that affects the sweet corn during the season, do in the Winter?

PROF. SURFACE: It passes the Winter as a pupa in the ground and it is like the potato beetle or any other pest that has that habit, and it is much more likely to recur where you have the crops in continuously in or near the same vicinity.

MR. J. ALDUS HERR: Quite a good deal of wheat in our county has been treated with this material for the moth. I had some treated by our farm agent which was successful. I also have seen some

wheat treated, but I had two sacks or bags in my granary, that we treated more severely than the rest. I had not sufficient seed wheat and had to use those two sacks of wheat, and the result was that a great deal of it did not come up, it spoiled the germination. Now the question is how severely need we treat seed wheat and not injure the vital parts of it?

PROF. SURFACE: That is a very important question and I believe that the details have not been fully worked out, because of the varying effects on seed, due to varying temperature. I mean to say this, if it is fumigated with a certain amount of carbon bi-sulphide when it is at a temperature of 60 degrees, it will not injure the wheat near as much as if it is at 80 degrees temperature; there is a law to be established in there relating to the amount of carbon-bi-sulphide to be used in relation to the temperature; it is not worked out, Mr. Herr, but that is the reason of it, we know that much. There is a little experimental work to be done.

The CHAIRMAN: Are there any further questions or discussion on this report? If there are none, the report will be received and printed as part of the proceedings of the Board. Next on the program is the report of the Advisory Committee; does the Committee have a report? Mr. Schultz, I think, is Chairman of the Committee. Mr. Black is a member of the Committee. Mr. Joel A. Herr is a member of the Committee. If there is no report, before we adjourn I would like to announce the evening program. Two eminent men will talk very interestingly and I would suggest that you arrive promptly at 7:30. The evening meeting will be held in the Hall of the House of Representatives and will be opened by the Governor. Is there anything further before we adjourn? If not, we stand adjourned until 7:30.

HALL OF THE HOUSE OF REPRESENTATIVES

Capitol Building, Harrisburg, Pa.

January 26, 1916, 7:30 P. M.

Vice-President Fenstermacher in the Chair.

The CHAIRMAN: The Governor cannot be here to open the meeting, I am sorry to say, but he will be here later. First on the program is an illustrated lecture by Prof. L. H. Dennis, State Director of Agricultural Education, entitled "Vocational Agricultural Education."

VOCATIONAL AGRICULTURAL EDUCATION

By PROF. L. H. DENNIS

It is sometimes necessary, these days, for a man who contemplates speaking upon any agricultural subject to first qualify himself, because there are so many persons talking about this subject who, some people think, have no license to talk upon it. I am reminded of that little paraphrase that runs something like this:

"Lives of great men are all reminders
That there's one unfailing song;
If a name we'd leave behind us,
Just be born upon a farm."

And so the man these days who can say, "I was born and raised on a farm," has said enough to qualify him in the minds of a great many people to speak upon an agricultural subject. I am not sure just what merit there is in the fact of being born upon a farm; I can say, however, that a boy can learn much and get much valuable agricultural experience if he is raised upon a farm. Now it happens to be my misfortune, if such be the case, not to have been born upon a farm, but to have lived upon a farm as a boy and to have had various experiences which I will not relate at this time. The fact of the matter is, it would not do, probably, for me to relate some of the experiences that I enjoyed on Sundays and other days when the folks went to town and left me in charge. I well remember one incident, however: In my days we used to plow with oxen and used them for various other purposes also, and I recollect that I did not enjoy the plowing with those oxen as much as I did the Spanish bull fight that I used to put on in the barn-yard when the folks were away in town. It was very fortunate for me, I suppose, that the folks never found out what my chief diversion was while they were away.

I am glad indeed to appear before you this evening and, in as modest a way as possible, attempt to give you some idea of what Pennsylvania is doing along the lines of Vocational Agricultural Education in the secondary schools of the rural districts. In these stirring times, when one nation is at war with another nation, when there are wars and rumors of wars, when the air is full of "preparedness" and intervention, anything that smacks of militarism is more or less popular and gets a ready hearing. I sometimes feel that it is wise for us to pause, even in times like these, and turn our thoughts away from destructive militarism and center these thoughts upon some of the constructive phases of our National life, such as the tilling of the soil.

You know, as a nation, we are more or less inclined to be hero worshipers. This has been emphasized very prominently in the past in the teaching of history in our public schools. The great men of this nation have been held up before the minds of the rising generation chiefly because of their services as statesmen or soldiers. I am not so sure but what we ought to do this; I think these men de-

serve the honor due them for such services; I believe there is a greater value in it, however, because of the stimulating effect it will have upon the civic life of the coming citizens of the Nation. I believe, however, that it would be a mistaken policy to neglect the study of the private and business life of these great leaders, for it seems to me the character of an individual is so developed by his private and business life that it determines, to a great extent, the type and amount of public service he is able or willing to offer. It is rather interesting to note that some, and in fact all of our text-books on history refer to George Washington, the central figure in this group, many times with reference to his services as a soldier; many times also in connection with his career as a statesman, but very seldom refer to him with reference to his occupation as a farmer. Now we know that George Washington lived on a farm, or rather a large plantation, in Virginia. We also know that Thomas Jefferson, another one of the great leaders of our country, was a farmer. We do not know him as a farmer, probably many persons are not aware that he always gave his occupation as that of a farmer. It is interesting to note, however, that it was only in the business of farming that he failed. He made a success of nearly everything else he undertook, but in farming he was not a great success, although he was a great lover of farming. Thomas Jefferson realized that the business of farming was indeed a big business. He realized some of its limitations in his day. You will recall, many of you perhaps, that he made some suggestions for the improvement of the plough of his day, which was a very crude affair. Thomas Jefferson, George Washington and Benjamin Franklin and other leaders of that day realized that there was a great need for more reliable scientific information concerning the great business of farming. I emphasize that they realized that way back in their day, and the fact that they did realize this showed itself in the formation of the first American Agricultural Society in the City of Philadelphia in the year 1785. George Washington and Benjamin Franklin were both members of this first American Agricultural Society. It was this first American Agricultural Society that really caused the development in Pennsylvania of the Pennsylvania Agricultural Society, established in 1851, if I am not mistaken, and this later led to the Pennsylvania Board of Agriculture, then called the State Board of Agriculture, and out of the activities of this State Board of Agriculture grew the very efficient Department of Agriculture which we have in our State today.

It is probably entirely unnecessary, when speaking before a body of this construction, for me to refer to the various branches of the Department of Agriculture of our State. They are carrying on many lines of agricultural endeavor in this State, and carrying them on so well that it would almost be out of place, I was going to say, for me to dwell very long upon this subject. I felt, however, that I wished to refer to it because I wanted you, first of all, to realize that the subject of Agricultural Education, in itself, to which I shall very shortly come, is not as new as some people would think. I want you to realize a little bit more fully perhaps than some of you have, if that is possible in such a talk as this, that that need was deeply felt in those days and that the agricultural agencies which we have today are possible because the agricultural leaders of a half

century, yes of a century ago, realized that need as we do today. I will throw upon the screen a few slides showing some of the activities of our own State Department of Agriculture.

There are many other lines of activities carried on by this Department that are just as much entitled to recognition as those I have shown here tonight, but time forbids my touching upon them. It may interest you to know that this State Board of Agriculture has been responsible for many lines of agricultural development in this State. It was this Pennsylvania Agricultural Society which later became the State Board of Agriculture, founded in 1851, as I stated before, that was really responsible for the founding of our State College of Agriculture. In 1853, just two years after the founding of the Pennsylvania Society of Agriculture, this Society recommended that an agricultural school be established in the State. The matter laid over until 1855, when the farmers' high school, as it was first called, was established. From the institution, in 1861, there was graduated a class of eleven students. This was probably the first class graduated in this country from an institution that was purely agricultural. My friends, there has been a marvelous development since that day. The class of eleven in 1861 has grown until today the enrollment in our splendid State College of Agriculture is somewhere between 3,500 and 4,000; the exact figures I do not have. It shows the merit of the institution. In 1862, Congress passed what is known as the Land Grant Act, by virtue of which each State receives certain grants of land, on the proceeds of the sale of which money was available for the support of these institutions, in part, provided the several states took advantage of the provisions of this Act of Congress by passing acts which gave the College State support, and the State has been committed ever since to this policy, of financially as well as morally and otherwise, supporting this State College of ours. It is an obligation on the part of the State.

The greatest work, it seems to me, that the State College is doing today—and they are carrying on many very valuable lines of work—one of the greatest lines of work that the College is doing today is the work of preparing agricultural leaders. My friends, I hope we all realize that this business of agricultural development, if we might so term it, is big enough, is so important to all the people of the State and the Nation at large, that it needs all the men that we can get. We ought to welcome the graduates of all our agricultural colleges; we ought to welcome all agencies. The business of farming is as important today as it ever was in the history of this country. The fact is, it is more important. These figures will give you an idea of how important it is. In 1890, 51% of the people of Pennsylvania were rural; today somewhere between 35% and 38% of the total population of Pennsylvania is rural. His Excellency, the Governor, this morning told us this, that only about 11% of our total population are farmers, and that percentage is slowly decreasing. A study of the population's statistics of the various counties of this State will show you that nearly every county in this State has lost in rural population, not only relatively but actually. It is a fact that the majority of the townships in Dauphin county and Cumberland county have actually lost in population since the year 1890. You may realize what the decrease in the rural population might be

relatively, it might be that certain rural district had more people today than they did in 1890 and still they might have a smaller percentage of the total population than in 1890; but the fact is that there has been an actual decrease in many of the rural townships as well as a relative decrease.

Here is the thing I want to call your attention to, regardless of the causes of this decrease, and it is a rather complex matter and I cannot go into it in detail, but regardless of the causes, here is the fact that makes this of importance to you and to me and to every person in this Nation of ours; there is a smaller percentage of the total population of this State and of this nation living in the open country and engaged in producing the food supply of the entire country than was the case back in 1890. I say that is of importance to the man in the city, it is of greater importance to him today than it was in 1890 when a larger percentage of the total population was living in the country. We are all familiar with the poem, "Still sits the school-house by the road, a ragged beggar sunning," and that brings back to our minds many pleasant recollections. The reason we like that poem, as you see, is because that poet made it a true picture. He knew whereof he wrote "A ragged beggar sunning." I wonder if this rural school (slide) could ever lay claim to making country life more attractive. Why, the very activities within the walls of this school rotated around the life and activities of the city and its business. Is it any wonder with boys and girls attending such a school as this—that in their hearts should arise the hope that some day they might go to the city to live and to work? I am glad to say that the people of the country are beginning to realize that it is more easily possible for them to have ideal school conditions than it is for the people of the city. The time will come when every school in the rural district as well as in the city will become the pride of the community the year around. If the school is to lay any just claim to raising the standard of home and living conditions in the community in which the school serves, it can only be because the school itself represents a higher standard than the average home of the community; otherwise, the influence of the school cannot be that of raising the standard of the average home.

My friends, this is a township high school (showing slide); moreover, it is a joint township high school operated by two townships. It is the type of school, my friends, which I believe we shall have to establish throughout the rural districts if we are going to get secondary education of equal efficiency and value to that offered in the high school of the city. You will note that there are 10,606 one-room rural schoolhouses in this State, of which 886 have ten pupils or less and 592 of which have been closed during the past ten years, partly due to the fact that many of our rural townships have actually lost in rural population, as I stated a few moments ago. I believe that either partial or total consolidation of schools will, in some measure, help us to solve the question of satisfactory, efficient rural education. I believe those of us who are from the country—and I want you to realize that in any remarks I make, I'm including myself—I think those of us who have anything to do with life in the open country will have to admit that we have come along just a little bit more slowly in the country in educational development than they have done in

the city. It takes us a little bit longer to become open minded on some things. Every farmer is from Missouri, he must be shown. I believe that is a good thing; we should not rush into those things, we should examine any new feature of education, any new line of activity, very carefully before making any very definite move toward inaugurating any new system.

May I call your attention to the fact that every slide I shall show you here this evening is a view of a Pennsylvania scene. I am enough of a Pennsylvanian to believe most heartily in Pennsylvania. I am so glad that our chief executive, his Excellency, the Governor, is trying to propagate the idea all over this State that we must love this great State of ours, that it is big enough that we can take a great pride in it. As Pennsylvanians I believe we have been rather slow to boost it, if I may be permitted to use a slang phrase. This slide shows a township high school out in the open country. In the township adjoining this there is another consolidated school where they operate fourteen or fifteen school wagons. I do not believe that consolidation is possible in all the rural districts. Partial consolidation will help us to solve some of the difficulties; in other cases, total consolidation. We have both in operation in Pennsylvania to-day. We have made more progress along these and other lines than the people of Pennsylvania are aware of. The reason is this: We are not given to boasting quite so much in Pennsylvania; just the moment we think of an idea, we don't put it into the newspaper, we try to work it out and let the works speak for themselves; that is why the people of Pennsylvania sometimes point to other states for examples in certain lines of work that have been carried on, certain educational ideas that have been developed, when right within our own borders we have had those same things for eight or ten or twelve years. I am proud to say that the views we are using to-night are all Pennsylvanian.

When we learn that the township lines sometimes stand in the way of the development of efficient secondary education, when we learn that the high school or vocational school of the open country must be a school which serves a certain community instead of a set area of land, then and only then, as I see it, will we have a school that will not only equal the good high school of the city, but, in some cases, surpass it, because we have facilities in the country, when we once learn to make use of them, that the city will never have. The joint school of the country, as it will prove to be in many cases, will give us a high school or a vocational school of such size that we may have a faculty of four, five, six or seven teachers in this particular group.

The faculty in the vocational school in one of the west central counties. In this group are three college graduates, one man trained in agriculture, a man who was born and raised on a farm and a man who has had teaching experience, a man who is a graduate of our State College of Agriculture, and two of the others were especially trained along the lines of music and drawing. We can never hope to get a faculty of that size, having the training and ability I have just mentioned, in our small, third class high schools. Splendid work has been done by the school districts in the country, don't misunderstand me; splendid work has been done in the development of the

high schools of this State but it is only a beginning, it is a step towards something else still better. This is a group of students in a secondary school of higher vocational education. Schools like this right out in the open country will make some things possible that never will be possible in any one teacher third grade high school.

It seems to me that if we are going to have well trained teachers in the country, there are two or three things at least that are vital. In the first place, we must pay such salaries that we can attract and demand well trained teachers, teachers that are trained for this line of work, prepared for this line of work. The compensation must be adequate enough to hold the good teachers, those that prove themselves to be successful; and third, we must have teaching conditions attractive enough at least to hold the teachers in the country. What the country needs all teachers who know the needs of the country, who understand conditions, who have lived in the country, who will come out in the country and live there, not board there, not stay just during the day, but who will come out and live in the community and become one of the people. I believe that is essential. There are those educational leaders who believe that in order to get this we shall have to provide homes for our teachers. That may be a disputed question at the present time; I merely call your attention to it.

This happens to represent a home belonging to a school district and the Board of School Directors have placed this home at the disposal of the principal of a consolidated school. Now there are some people who may think that in a public school the teaching of agriculture is more or less new. I want to again emphasize the fact that agriculture as it is being taught in our schools, is no newer than the need, the realization of the need for agricultural information. In 1825, there was an agricultural school established in Maine; in the year 1916 agriculture is taught in the public schools of every state; it is taught in over two thousand high schools in Pennsylvania; it is taught in twenty-one counties on a vocational basis. I realize, as well as any one else, that there is some very poor teaching in agriculture being done, that mistakes, grave mistakes, have been made in the teaching of agriculture in our schools that have brought severe criticism and condemnation upon the whole matter of agricultural education. I realize that many teachers who have attempted to teach this work have not been prepared. I also realize that it has been an almost impossible task for a teacher unprepared, having text-books not suitable for public school work—that it has been an almost impossible task for them to go into a school and do any kind of teaching along agricultural lines. But a beginning must be made, we profit by the mistakes we made more than by the successes with which we meet, and I think that Pennsylvania has profited quite largely by the mistakes made in the public schools. We are still making mistakes and probably will continue to do so.

The question of teaching agriculture on a basis satisfactory to the educators, the farmers, the boys who are taking the work, is in a process of evolution yet; we realize that. The school code of 1911 gives school districts all the authority they need, practically all the authority they need, to establish agricultural schools of various types. The vocational education act of 1913 provides specifically for agricultural departments in high schools and special vocational agricultural

schools, sometimes known as farmers' high schools or agricultural high schools. Usually in this State they are referred to as vocational schools or agricultural high schools.

You will probably be interested to know the distribution of these agricultural schools. I wish to tell you what determines the location of an agricultural department in a high school or a vocational agricultural school: First, the community must need that type of education; second, they must want that type of education; and in the third place, they must be willing to carry it on as it should be conducted. That accounts for the distribution of these agricultural high schools over the State of Pennsylvania. Some districts have been very anxious to have them. I wish to state also that there are a number of counties not marked up on this map which have filed applications with the Department of Public Instruction asking for State aid, the special State aid granted to carry on this work, and their applications are being considered at the present time. I would like to call your attention to the fact that there are but two counties on the northern tier of counties in which there are no agricultural high schools, McKean and Warren. I am glad to say for those counties that we have several requests from each of those counties. There are men in this audience tonight, members of the State Board of Agriculture, who have always stood behind agricultural education; there are members here to-night who have spoken to us with reference to the establishment of such agricultural high schools. In reading over the history of the Pennsylvania State Board of Agriculture, I was interested to find the number of times at which different members of the State Board referred to the necessity for agricultural education in the country. There are but two counties on the western frontier, Beaver and Lawrence, in which there is no agricultural high school. There is one county, Mercer county, which now has four of these agricultural high schools. Some of the states in the Union have established congressional district agricultural schools and some have established county agricultural schools. It is not necessary to explain them, because the name in each case explains the school, there being one school to each congressional district in the one case, and in the other case, one school to each county, and these schools attempt to serve the areas indicated.

But from our investigation we have found that it is impossible to serve a community of that area; it is not a community; it is simply a set area of land. In Pennsylvania we believe that secondary schools should be near enough to the people that the boys and girls of high school age can come to the school in the morning and return to their homes at night. Farmers need boys who are of high school age, and the boys and girls of high school age need their homes during that period in their lives. For that reason, instead of making large appropriations to any one school which would attempt to serve a congressional district or a county, that same amount of money is divided up into smaller portions and distributed throughout the State in small portions, each portion going to a community, so far as it is possible to distribute it.

This is rather a poor slide of a very good school, the Hickory Vocational School in Washington county. There is one man in this audience who lives within a stone's throw of that school. This is a vo-

cational school; in this school there is operated a four year course in agriculture and a four year course in homemaking for the girls; on this basis of one half of the day, the boy is with the supervisor of agriculture; the other half of the day he is in what you might term the high school; that is to say, he is studying academic subjects. He does not study agricultural subjects or practical subjects the full half day; it amounts to about 40% of his time. All boys in these vocational schools are required to take a vocational course for the first two years, getting the practical work with the academic work, not in place of it.

And, my friends, let me insert here, that this move to introduce vocational education in the rural district is not revolutionary in its character by any means, it is evolutionary, we are adding the practical work to the academic curriculum, rather than replacing the academic work. The girls are required to spent part of their time each day in vocational work for the first two years. At the end of two years, both boys and girls have the option of continuing in such a course or finishing in what might be termed an all academic course or all high school course. George Washington pointed out the fact that it was necessary in his time, and is necessary now—he pointed out in his time that a study of the soil should be made in order that its needs might be determined, in order that we might make it yield more than it does, in order that we might take care of it better. It is hardly necessary to state then that in an agricultural school we should have agricultural laboratories so fitted up that the boys in the class in agriculture might make a study of the soil. The work in the soil consists of theoretical work, if you wish to call it so. There must be some organizing of your information and that, I suppose, might be termed theoretical work. There must be some organization of that material, in order that the practical work in the laboratory and the field might not take up useless time, in order that time might not be wasted. The so-called theoretical work is followed by experiments in the laboratory and trips out into the field where the various types of soil are studied. It frequently happens, where we have these agricultural high schools located, that the boys in the class, with the help of the teacher, and sometimes with the help of the other members of the class, will make a complete soil survey map of their own home farm. As I partially explained a few moments ago, there are two ways in which an agricultural course may be added on to a secondary school in the country; either it may be added as a Department of Agriculture to an existing high school, or a complete vocational school may be established.

This slide represents a school in one of the western counties of the State. The old building on the left is the high school building; the new addition houses the Department of Agriculture in which a four year course in agriculture is given. In charge of that department is a man who devotes twelve months of the year to his work. One of the earliest schools started in this State was at Troy, in Bradford county. That school was so successful that the people authorized a bond issue in order that an addition might be built to their high school building to properly house the Department of Agriculture. The old building on the right is the high school building. In this addition there is an agricultural laboratory, poultry room, dairy

room, wood shop and a blacksmith shop. Field trips of all kinds are taken. Various methods are employed to take these field trips. Usually the boys walk. Very naturally, in some of our high schools, it happens there are enough farmers' boys who own automobiles or whose fathers' own automobiles, that it is possible to get the use of these automobiles while making their field trips. Quite a number of very interesting trips have been taken through the counties in which these schools are located. It would be impossible for me, in the brief of this lecture, to go into details with reference to any of these trips.

Poultry raising is of course a great interest to boys. If interest in poultry raising qualifies one as a boy, I suppose most of us here are boys, because most of us, particularly the men folks, are interested in poultry raising, and there is many a man who has made a stab at poultry raising, and some of them are now wiser. All kinds of practical work are carried on in connection with the study of poultry raising. In these schools a study is made of the various methods of killing and dressing chickens to put them upon the market. After this study has been made, the supervisor of agriculture gives a demonstration showing how the chickens should be killed and dressed according to that particular method he has described. This is followed by work on the part of the boys. In some schools where we have a home-making department in connection with the Department of Agriculture, we are able to correlate the work very nicely, the boys killing and dressing the chickens and turning them over to the girls, who cook and serve them. The boys correlate again on eating them.

This is a group of boys in one of the first departments we established in Erie county. The town of Waterford, in Erie county, has a very live poultry association and conducts a poultry show. These boys are interested and desired, when the time came, to submit some birds, and they did. In the shop work they built every one of the coops shown on this slide with the exception of one which was the model from which they made their own. They also had an agricultural exhibit. Mr. Wittman of the State Board of Agriculture, visited this class and took the boys on a tour of the town. He visited a number of the chicken pens of the town by daylight and gave the boys a number of very valuable hints on the subject of poultry. Farm forestry is also one of the subjects of the four years' course in agriculture in these schools, not forestry as a profession, but farm forestry as applied to the farm. It seems to me that any boy, that every boy has a right to expect that his school shall train his hand as well as his head. That is particularly true of the boy in the country. I believe we make a mistake when we train the boy's head alone. In order to give the boy an all around development, I believe we must make provision to train his hand and his head and his heart. Blacksmithing is a part of the four years' course in agriculture. Woodworking of various kinds—this happens to represent a class in rope splicing. The boys take a keen interest in this work. Harness repairing, as it is practiced on a farm, is also taught in these schools. The boys are taught how to use tools, how to take care of tools, they are taught the various processes connected with the use of tools. The work which they do is not the manual training of to-day, good as that

is, but it is what you might term applied manual training, it is applied shop work, it is what we like to term farm shop work. The things the boys make while they are learning the use of tools and the processes involved in using the tools have some direct bearing on the working of the agricultural course, some direct relation to home farm life. These boys built this colony house. There is a correlation between shop work and poultry raising.

It is hardly necessary to point out that a four years' course in agriculture would be incomplete without a study of farm crops. This one slide will give you a very slight idea, a brief glimpse only, of a part of the practical work carried on in connection with the work of farm crops. These boys are looking over the result of a germination test of corn. The boys are taught how to select and store corn and carry on the germination test. These boys, in connection with their work in vegetable gardening, planned out, drew the plans of and made a hot-bed and planted therein certain vegetables. Here you will note them glazing the sash; they made and glazed the sash. Perhaps that is hardly a very practical exercise, because as a rule a man buys his sash rather than making and glazing it, and yet for one illustration perhaps there was no valuable time lost. This second slide shows them completing the hot-bed. This again is correlation between the farm shop work and the vegetable gardening work. Dairying is a very important industry and in many of our counties if the teaching of agriculture in our schools is going to be of value, it is because it is practical, it is because we are teaching the boys to work with things rather than to talk about things. This means that it will be necessary for us to have, as we do have in these agricultural schools, it will be necessary to have laboratories fitted up with dairy apparatus; it will be necessary to make frequent trips to dairy farms.

This slide explains itself. I think you will realize that it will be impossible for me to give you more than a glimpse into the various utilities of these schools. The one thing I want to leave with you is this, that an attempt is being made to make the work through and to make it practical, to connect up the work of the school in a very definite way and in a practical way with the work of the home and the work of the farm. Every boy who takes this four-years' course in one of these agricultural high schools must each year carry on an agricultural project. This is another illustration of the attempt to connect up this work with the home and make it practical. This boy chose a poultry project. He hatched out as many eggs as he could from the eggs you see there. He selected the male birds and caponized them and in the fall he put on some very healthy specimens of capons. The boy received a great deal of valuable information in connection with this and received some financial remuneration.

This boy is a freshman in a small agricultural high school and decided that he would like to grow some tomato plants. He was very much interested in tomatoes. He planted fifteen hundred tomato plants, or secured that many from the number of seeds he planted, and transplanted them and took care of them. Every boy who carried on an agricultural project under the close supervision of the supervisor of agriculture, must keep a daily record of everything he does, his expenses, the work that he puts on, the methods that he employs, in order that he may learn some lessons thereby. From that record we

know that this particular boy went out one night, on the night of the fifteenth of June; it happened in that year and covered up this many of his fifteen hundred tomato plants with newspapers to protect them from a frost which his daily record shows came that night, a very heavy frost. His father did not cover his plants up and lost many of them. This boy bought for himself a canning outfit and later in the Summer a second outfit, because he was so successful in canning these tomatoes and other vegetables; he put his own brand of canned corn, tomatoes and beans upon the market, and at the close of the season he had not only had a kind of work that kept him interested and out of mischief, but he had also cleaned up the tidy sum of \$130.00. It seems to me that there is value in that.

May I call your attention again to the fact that the supervisor of agriculture in these high schools is employed for the year around? He stays there during the Summer and visits these boys as frequently as possible for the purpose of giving them instruction in connection with their agricultural projects. Now, my friends, we have learned how to feed the hen; we have learned that the hen is an egg factory on legs—I came near saying on wheels; we have learned that if we want to make a hen produce eggs, we must feed that hen those materials which make eggs and those elements which will also carry on the body functions of the various organs in that hen. We have that down to a science. Mr. Wittman, of your own State Board, has told the people of this State many interesting things. We know that we can feed Lady Eglantine, of whom you have all undoubtedly heard, an exact ration, which will make her lay eggs without any eggscitement, and may perhaps make her a little eggotistical. (Laughter). We have learned, my friends, how to feed this happy family to keep them happy until the day of reckoning comes. We have even passed some laws providing for their comfort when traveling. I say we have learned how to balance rations for chickens; we have learned how to balance the rations of hogs so that we can make them take on the greatest amount of fat with the least possible expense and the greatest profit to us; but the thing that we have left to the last, the thing we know the least about to-day is the balance ration for the human individual.

Oh, I know there are people here and those who have made a study of this. I know that a wonderful start has been made upon it, but I mean that as a people we know little or nothing to-day about the science and art of right living, my friends. Our mothers were good cooks, our wives are good cooks—many of them; but these wives of ours and we ourselves know little or nothing about the balance ration we ought to eat, the ration which will enable us to keep in good health, to perform the work we want to do; we have left that until the last, and I believe the reason is because we can see some financial remuneration in feeding the hen a balance ration or in feeding the hog or the steer or the dairy cow; we can see how that touches our pocket-book, and for that reason we immediately get busy and make a study of that. It does not, at first glance, seem to touch our pocket-books quite so soon, the feeding of our boys and girls and ourselves, and we have left that until the last, but I am glad to say that we are making a start in this country and Pennsylvania is keeping step with the other states along this line. I know there are some here

and there, some mothers, some good mothers, and some good fathers of girls like these who say that it is unnecessary to teach girls how to cook or how to sew, but, my friends, if you would make a careful survey of the conditions in this State and find out just how many girls, sixteen, seventeen, eighteen and twenty years of age to-day know anything or much about cooking, I'm afraid you would be sadly disappointed. The slides I have just shown you are views in our agricultural high schools. This is not a view of a dining-room in some mansion in the city; this is the dining-room in the home-making department of the Hickory Vocational School in Washington county. We have several others just like it. Don't get the idea that extravagance is being taught there; the very opposite is true—plain simplicity. The girls enjoy work of this kind even though there were some doubters at first, but even these doubters became earnest believers after a while. I could show you many views right along this line, but just one or two more is all I have time for, just to give you some idea of what we are actually doing in Pennsylvania. We have been at this three years; we have been at it longer than that in the teaching of Domestic Science, but we have been at the teaching of agriculture on a vocational basis in the great State of Pennsylvania for three years and we have been saying very little about it.

Some one has made a study of the process of carrying bricks from the ground up to the scaffold, and the man who made that study discovered that, simple though that operation is, yet a study of it will make possible the simplification of the operation involved in putting the bricks in the hod and the hod on the man's shoulder and the climbing of the ladder and the dumping of the bricks on the scaffold. This study enables a man to perform more work during a day with less fatigue to himself and greater profit to his employer. I am not so sure but what the simple process of laundering, if you wish to call it simple, might not stand some inspecting in some things; when I examine some of my shirts that have come from the laundry, not those that have been done at home, I am glad to say, but those that come from the hands of other people, I feel that the business of washing and ironing would stand some little inspection. Now my friends, I believe there is no reason why, just because you and I are beyond the school age, just because we have passed certain milestones in life, that the doors of the public schools should be closed to you and me. I believe you will agree with me that we know now the value of an education better than we did in the days when we were receiving the education and training that the school offers. I see no reason why the expensive school plant, which is the property of the public, should be closed so many hours in the day, so many days in the week, so many weeks in the year, or why it should be closed to those who have passed beyond a certain age. I am glad to say that we have been able to find some way in which the school plant could be of more service to the entire community in these agricultural schools.

This particular slide represents only one particular phase of the increased service that these schools attempt to give. You will notice on the next to the top shelf and the shelf just below that there are bulletins issued by the United States Department of Agriculture,

by our own Department here and by our own State College Experiment Station, all classified and on file ready for instant use by any farmer served by that school whenever he wishes to ask for it. This slide explains itself. In many of our agricultural schools, particularly those that have been established for at least a year, we are conducting what we are pleased to call farmers' night schools and night schools for farmers' wives. These have been very successful. This slide represents a group of farmers in attendance at one of these night schools in one of the small agricultural schools. I emphasize the fact that this is a small school, because I wish to show that, even though the school may be small, if it has the proper facilities, the teaching force and equipment, it can serve a large community. In this particular night school there were ninety-six farmers enrolled. The evening on which the photograph was taken was a very rainy evening; the roads were almost impassible, but there were ninety-six farmers enrolled in the night school. The night school wound up with a two days' farmers' institute, I think they called it in that particular case, and I wish to say here that the State Department of Agriculture and State College have been co-operating most splendidly with our leaders in these agricultural high schools. I believe it is the beginning of a better day, as far as co-operation between agricultural agencies in this State is concerned.

I believe that one of the biggest opportunities of the day, as far as agricultural development in Pennsylvania is concerned, is the opportunity of bringing about a closer articulation between the agricultural agencies of the State in order that they may work in closer harmony. It will be a great day for Pennsylvania when some man works that problem out; it will be a great day for every agricultural force in the State, my friends. We are beginning along that line in these agricultural schools. The men of the State Board of Agriculture and farmers' institute speakers come to our agricultural high schools and deliver addresses. State College sends its men there. This illustrates the way in which the school sometimes reciprocates, furnishing a part of the program. The girls in this particular home-making department gave a demonstration for the benefit of the farmers and their wives.

Now what are we to expect from this agricultural education in our schools? Whenever any boy raises an unusually large crop of corn or an unusually large crop of potatoes, immediately his name gets into the newspaper, he gets considerable publicity. I am not so sure that that is wrong; I believe that is a good idea. Sometimes we overdo it, perhaps, but the harm that may come from this is that it may lead some of us to believe that the real purpose of agricultural education in our public school is the production of large crops. I am not saying that these are illustrations of what the boys in our agricultural schools are producing. Undoubtedly the boys who take strawberry projects may increase those and get larger strawberries. They say that two heads is better than one, even if one is a cabbage head; I presume that would be true in this case, but, my friends, what is the real purpose in the introduction of agricultural education into the public school? I tell you, my friends, it is the boy and not agriculture. The development of agricultural conditions, the improvement of agricultural conditions, as important as it is and as necessary as it

is in some sections of the State, is a by-product, my friends, it is a by-product only of the work of agricultural education in the public school. It is the boy that is the key-note of the whole thing, and not agriculture. Agriculture is a mighty important by-product; agricultural education in itself would be impossible without the necessity for the development of agriculture, but it is not the production of greater crops or better crops, it is the development of this boy, it is because we wish to give this boy the type of education that he ought to have. That is why agricultural education has been introduced into the public schools.

May I refer to that slide once more? I trust you have carried it in mind; there are eleven boys in that class, in this particular school represented by this slide. They usually graduated two or three boys each year. This was a class of boys belonging to the junior class; there are eleven boys in that class, not all in the picture. Nine of those eleven boys were taking the course in agriculture in that high school; eight out of those eleven boys were over six feet tall. None of the boys in that class were less than five feet ten. The one boy in the center of the picture was a boy imported from another class merely to give you an idea of the size of the boys in the class. Why do I mention that fact? Here is the reason; we must set some standard or some gauge by which we can measure the efficiency of this type of education; we realize that. If we succeeded in holding those boys who would otherwise have dropped out of school, who would have received no high school education, it seems to me that we have done one thing to justify the introduction of agriculture into the public schools in rural districts. Again, may I refer to the fact, that previously this school graduated two or three boys only? In this class there are eleven; eight of them are over six feet in height; this shows that we are able to attract older boys, more mature boys, who would have dropped out of school if it were not for the practical work there offered. I think Luther Burbank has put it very nicely when, in urging men to stay upon the farms and engage in plant breeding work, he says, "The time will come when more men will do this; the time will come when men's thoughts will be turned away from destructive war and will be turned to higher things, when man shall offer his brother not bullets and bayonets, but richer fruits, better grains and fairer flowers."

The CHAIRMAN: Ladies and Gentlemen, Members of the State Board of Agriculture; I take pleasure at this time in turning the meeting over to your President, Governor Brumbaugh, who will introduce the next speaker. (Applause).

(Governor Brumbaugh takes the Chair).

GOVERNOR BRUMBAUGH: Ladies and Gentlemen: It is an auspicious hour in the history of Pennsylvania when the good people gather to consider any question that has to do with the development of our agricultural interests. We are peculiarly fortunate to-night because one of our own educational experts has already addressed you on an important problem, and we are now also fortunate because we are honored with a visit from a distinguished member of Con-

gress, from a neighboring State to the West, who has been in the past a member of the Committee on Agriculture in our National Congress and is now a member of the Commission of Banking and Currency, and who has been sent abroad to study the problem of Foreign Loans and Markets in all the important agricultural centers of the world. I think I may safely say, and I think I may modestly say, that Hon. Ralph W. Moss is probably the best informed man in the United States on the subject upon which he will address you to-night. I have very great pleasure in introducing to you Mr. Moss. (Applause).

Mr. Moss then delivered the following address:

"RURAL CREDITS."

By HON. RALPH W. MOSS, *Centre Point, Ind., Member of the National Congress*

Mr. Chairman and Gentlemen: I wish to express frankly the pleasure which your very courteous invitation gives me. I feel it an honor to be permitted to discuss some of the great problems which lie before us. But this sense of esteem is enhanced to any Western man when his invitation comes from one of our parent states in the Union. I come far enough from the West to have been born amid pioneer conditions. I have seen the splendid farm civilization of our State spring into existence. We have improved our highways; builded modern residences; founded churches, universities and schools; and our lands have risen in value nearly to the level of European countries. Thus, in a generation, we have grown wealthy and have surrounded our families with all the comforts and many of the luxuries of life. Many factors have contributed to this wonderful growth and progress; but chief among them (and the only one I will name tonight) has been the aid and assistance which has been given us by the states east of the Allegheny Mountains.

The first farm journals which came into our homes were published in your cities; the best blood in our domestic flocks came from your herds; our orchards grew from your nurseries; our gardens were planted with your seeds; and the improved yield of our field crops was due to the improvement which your masters had wrought in our seed grains. Thus we owe to you our political liberty as a nation and our present splendid position in American agriculture.

I use the term "splendid position" advisedly and with due consideration. I have come tonight to urge certain legislative measures which, in my opinion, will enable us to strengthen our economic position as a nation by perfecting a better organization among farmers; but in our zeal as propagandists for these new measures I trust we may not forget the many exceptional advantages which we now enjoy. I have often asserted and feel free to repeat tonight, that farmers in the United States now enjoy greater advantages than any generation of men since Abraham pastured his flocks on a thousand

hills. I refer of course to the splendid markets of our nation; to the well developed system of railway transportation; to the good roads which have been builded in so many sections of our country; to the improved seed grains; to the vast improvement in livestock; to the wide diffusion of scientific knowledge of agriculture among our people; to the trained leadership in agriculture and to the blessings of self-government. No other generation of farmers enjoyed at one time so many of these advantages which go to produce wealth, peace, happiness and prosperity among the great masses of people in any nation. It is fortunate for the world that the present moment finds the American farmer so happily situated. We are facing one of the great crisis in the world's history. The world is today looking to us for food and clothing in a greater degree than at any time in history. These imperative demands must continue for a generation; and if extreme privation, hunger and even starvation in the world at large is to be averted, it must be through the industry and the intelligence of American farmers. We are facing a great opportunity; but we have also a mighty responsibility. It is these grave considerations which make the present movement for a better organization and a more productive agriculture in America not only of national but of world wide importance.

Your invitation was to speak on Rural Credits. I take it that this invitation was extended because of my connection with the preparation of the bill now pending before Congress and which is ordinarily taken to be the basis of legislation on this subject. I refer to H. R. No. 6838, and presume that you will expect me to discuss the terms of this particular bill rather than to attempt an address along general lines. I beg to say, in passing, that it is vastly easier to present ideal results which you hope may flow from a measure of legislation than it is to construct the actual statute. It is likewise easier to present criticisms against a bill, to give way to the fear which is always present, than it is to suggest other provisions which will accomplish the desired result and avoid the evils complained of. I am fairly well acquainted with the literature on this subject and have read much of what has been said and written by many who pose as authority on this subject, without finding any helpful suggestions to those whose duty has been to frame this legislation.

We desire legislation which will be national in its character and which will go into operation under favorable conditions in all parts of the nation. It is especially desirable to secure as uniform a rate of interest as possible and to reduce that rate to as low a degree as the economic conditions of the nation will permit. It is likewise desirable to encourage farmers who are now in debt, to fund that debt in long time obligations on terms which are tantamount to a savings investment. It is the experience of the world that only those who are enabled to save a part of their daily income ever become financially independent. It is in this sense that policies in endowment life insurance and shares in building and loan societies give financial independence to their holders. We seek to extend these advantages to the farmers who are in debt for their farms or who desire to borrow money to improve them. Such results are only possible by an investment made under an organization, controlled by competent men, supervised by law, and in volume of business large enough to invest

small savings to the best advantage. This suggests co-operation, as a business method. We seek to create a system which, when fully organized, will include farmers from every section and every neighborhood in the nation. In the aggregate, the volume of business will be very large; the cost of expert management will be correspondingly small. Thus the individual farmer, though his business will be comparatively insignificant, will be given every advantage of a stockholder in a large corporation, officered by experts. His mortgage which is ordinarily an extreme burden is changed into a long time lease on a tract of improved real estate which, through his labors, will yield sufficiently to pay him remunerative wages and to meet his liabilities, so that he will enjoy the benefits of proprietorship with a reasonable certainty of attaining a title in fee to his holdings.

These results require a national organization and national co-operation among American farmers. The very territorial size of our nation suggests many difficulties. The many different state laws as to land titles and the exemptions from debt makes the problem a difficult one. The independence of the American farmers, many of whom are in fact, real pioneer settlers, adds to the difficulties of framing a general statute which is applicable to all parts of our natural territory. It is but little wonder that we have spent more than two years in arriving at a satisfactory solution of this subject.

I am well aware that there is a wide spread interest in personal credit aside from mortgage credit. It is said, and truly too, that our landless tenants need especial assistance in the way of necessary credit. The bill under consideration deals only with mortgage credit; but before I begin a discussion of its terms and conditions, I beg to refer briefly to our new banking and currency law, commonly known as the Federal Reserve System. It is well known that farmers are charged high rates of interest in many sections of the United States on personal loans. The Comptroller of the Currency, Honorable John Skelton Williams, has publicly called attention to some of these usurious rates. He has given instances, taken from the actual bank records, which are nearly unbelievable. For instance, he mentions one case where a woman paid 120% interest on \$110.00 which was borrowed to purchase a horse. Many individual loans are instanced where the rate of interest runs higher than 100%. I will not lengthen my address to repeat his examples. His address before the Kentucky Bankers' Association can be secured upon application to the clerk of the Commission on Rural Credits at Washington. It is well worth reading by any student of this subject. It naturally brings up the subject, "What influence has our new banking law had upon the situation so far as it affects loans to farmers for short periods of time?"

No student of the subject will admit that the present system is fully organized and has as yet exerted its full measure of benefit to the farmers. We have had, however, sufficient actual experience to know that without supplemental legislation, the system will not be able to help agriculture to the full measure of its possibilities. Every modern system of personal credit—rural or commercial—is based upon the power of the government to issue money or certificates of credit. The volume of money available under such a system is increased by the government rediscounting notes held by banks, or loans by the bank of issue to the borrower. Thus in times of stress both the

volume of money and the rate of interest are controlled by the government bank of issue. It has been declared by the present Board that its policy will be to grant to agricultural paper—paper secured by warehouse receipts representing agricultural products—a preferential rate of interest. The rate under present conditions, on this class of paper is three per cent. This rate is as low as any foreign government has ever given to its farm citizens. Last year, we grew nearly what the government has ever given to its farm products. If these products had been properly classified and warehoused, this immense value would have been available as collateral security at this very low rate of interest; and these commodities were in actual ownership and control of our farmers. The Southern farmer was able to take a limited advantage of this rate because, under the law, the Department of Agriculture supervises the grading of his cotton. This is done under the Cotton Standard Act. Of course, it is but a beginning. Neither the banks nor the farmers fully understood the possibilities which lay before them. Then, too, the banks were afraid to encourage this low rate for fear of the effect it might have on their commercial business. There was, however, several million dollars of rediscounting done by the Federal Reserve Banks at the three per cent. rate. This business is sure to grow by leaps and bounds as education spreads among the planters of that section.

The same opportunity is open to the Northern farmer as soon as we can secure a law standardizing our farm products as cotton is standardized. I had the honor to introduce the Moss Grain Grades Act in the last Congress. It passed the House by practically a unanimous vote but failed in the Senate. I have reintroduced it in the present Congress and it is number 4646. Mr. Lever has introduced his Warehouse Bill. The bill also passed the House during the last Session but failed in the Senate. The Grain Grades Act authorizes the Secretary of Agriculture to fix uniform standards of quality and condition for all principal commercial grains and to supervise and enforce their application in the grading of all grain offered for sale. The Warehouse Act authorizes the Secretary of Agriculture to license and to bond warehouses open to all producers of farm products who may care to store them therein. The government will have supervision of all operations of warehousing, grading the products, and issuing the receipts. If these two bills were in force, any farmer in the Union could take his surplus farm products, have them graded according to government standards and store them in warehouses supervised and bonded by the United States. He could then take his receipts to the nearest bank and get a lower rate of interest than is given to any other class of paper. If farmers were to organize a co-operative bank, it would be entirely possible to secure money at three per cent. less only the overhead charges of operation. These two proposed laws must be enacted if we are to secure the full benefit of our new banking law. If farmers will organize and demand the passage of these measures, they will be enacted into law. It is the open door to cheap credit; it is a certain method of securing three per cent. money to finance our farming operations, and if we press forward along these lines, we will secure for ourselves as low rates on personal farm loans as any nation has ever granted to farmers for like purposes. Can we ask for greater results?

I have thus briefly referred to personal credits not only as an answer to the criticism that nothing is being attempted to improve present conditions, but also to call your attention to the very broad comprehensive legislation program which is before Congress at this very moment. I confidently assert that these three measures, the Grain Grades Act, the Warehouse Bill, and the Mortgage Credit plan, taken together, constitute the most important legislation affecting agricultural interests that has been introduced in Congress for a generation.

I have spoken briefly of the purpose of rural credits and some of the difficulties to be overcome in framing legislation to meet our conditions. The present bill, H. R. No. 6838, creates a national system of mortgage banks to be operated by a federation of farm borrowers, organized as a co-operative association. It also authorizes a separate system of mortgage banks, organized as corporations and controlled by private initiative. These two systems are separate and distinct; nowise antagonistic but everywhere competitive. In practically every other country of the world, mortgage banking has been successfully organized under each of these plans. They bear the same relation to each other as the mutual and old line insurance companies. The provisions of the bill do not give any special advantage to either plan but seek to permit their organization under the most favorable conditions. The entire system is put under the control of a Farm Loan Board, consisting of five persons appointed by the President and confirmed by the Senate. Not more than three members of this Board may be chosen from any one political party. The members are appointed for a term of ten years and are paid a salary of \$10,000 per year. It is the purpose to secure high grade, competent men, giving them ample power under long tenure and freeing them from political control. This Board organizes the new banking system and when once in operation, exercises supreme control over its functions. This Board is given power to divide the United States into twelve banking districts and to organize a land bank in each one of these districts. It is the purpose of the bill, as the system grows, to increase the number of land banks, until ultimately it may be that there will be a land bank authorized for every state in the Union. The number twelve was chosen to correspond with the Federal Reserve system, but ample provision has been made for the organization of new districts, whenever, in the opinion of the farm Loan Board, such action is necessary. These land banks must each have a subscribed capital of at least \$500,000 before they can begin doing business. This capital may be subscribed by individuals, corporations, municipalities, or the government of any State; but in case it is not subscribed through these sources, then the Government of the United States is obliged to make such subscriptions.

At this point we reach the moot question of government aid. From the very start I have been opposed, personally, to those extreme measures of government guarantee of the bonds or a direct loan to borrowers by the government. It is practically impossible, however, to found a co-operative system and put it into actual operation throughout the nation unless some good angel will advance the initial capital. If this capital is sought to be secured by the issuance of shares of stock, either the holders of these shares must forego dividends or

else the system can never become purely mutual and thus grant loans to its members at the lowest possible rate of interest. We have no such spirit of altruism in this country as would make it reasonably certain that foundation capital could be secured from private sources without the pledge of dividends. Thus the only practical way of organizing the system is to ask the government of the United States to advance temporarily the foundation capital, to be returned out of the subscriptions to capital stock which will be made by the borrowers under the plan of the bill. I am glad to be able to say that this happy compromise has been accepted by those who framed this bill and I express the hope that it will be equally acceptable to every advocate of this legislation. This provision makes it possible to organize a co-operative system which is owned and controlled by the borrowers themselves and a system where all the net earnings go as dividends to the borrowers in proportion to the face of their loans, thus giving them service at actual net cost.

These land banks do not have the power to negotiate loans directly with the individual. It will be seen at once that a land district which may compromise several states is too large a district to be assigned to any one institution transacting a business which requires it to gain an accurate knowledge of the value of many widely separated tracts of real estate and become acquainted with the personal character of thousands of individual borrowers.

In order to extend this organization and bring it close to the homes and lives of the borrowers, the land bank is required to conduct its business through local loan associations which are to be organized by farm borrowers in every neighborhood of the nation. Ten or more persons may organize such an association, each member, however, owning land and desiring to become a borrower in the system. Every member of the local association must subscribe for stock in the local association equal to five per cent. of the face of his loan, and the local association must make an equal subscription to the capital stock of the land bank. Thus the capital of the land bank grows in proportion to its volume of business, always bearing the ratio of one to twenty, and except the original subscription of \$500,000, all stock of the land bank is held by the local association in trust for their membership. Whenever a member pays off his loan the land bank pays back at par his subscription to the capital stock and cancels his shares. This act severs his membership in the local association so that none but borrowers can belong to the organization. All voting power is held by the members of the local association. Thus the whole system is democratic and is controlled by the men who are actually borrowing money from the land bank. The local association passes upon the character of the borrower when he applies for membership in the association, and through its loan committee, makes an appraisal of the land which is offered as a basis for his mortgage loan. This appraisal and recommendation from the local association is forwarded to the land bank together with an application for the loan. The land bank sends an appraiser to re-appraise the land. The appraiser is an officer of the government and his salary is paid by the land bank. The report of this appraiser fixes the value of the land as a security for a mortgage loan which cannot exceed 60% of the

appraised value. The land bank sends the money to the association and the association pays it over to the borrower. Likewise the borrower makes his several payments to the local association which forwards the money thus paid to the land bank.

The local association is but an agent acting for the land bank to secure accurate and intimate knowledge of the land values and personal character. Each borrower insures his own loan to the extent of five per cent. of the amount of the loan. We have every element of safety; local knowledge, mutual liability, and self interest. The land bank, as the mortgages accumulate, deposits them in amounts not less than \$50,000 with an officer of the Farm Loan Board called the registrar. These mortgages are held in trust by the registrar as special security against an issue of bonds. The Farm Loan Board causes an appraisal to be made of these mortgages and issues permission to the land bank to issue bonds. There must always be an amount of unpaid mortgages on deposit with the registrar equal to the par value of bonds outstanding; and as mortgages are paid off, either in whole or in part, these sums must be reinvested in farm mortgages, or farm loan bonds must be purchased in like amounts and cancelled.

The success of any mortgage system must depend upon the ready sale of bonds. Not only are the loanable funds secured by the sale of bonds, but the rate of interest on farm mortgages is fixed by the rate of interest on the bonds. The whole system of mortgage banking is devised to enable the farmers of the nation to pool their assets, and by issuing bonds, to borrow money at low rates of interest. A successful system will thus not only secure money for farm borrowers, but it will develop a safe investment for the surplus earnings of the nation. It seeks to cause money held for investment to flow towards the farms and thereby develop a mutual financial relationship between industrial centers and agricultural territory. This requires an attractive credit instrument. Every bond issued by a land bank is freed from all forms of national and local taxation; it is secured by a first mortgage on improved real estate which is worth at least twice as much as the face of the bond. It is further secured by the capital stock of all the local associations in that land district. It is also secured by the capital stock and reserves of the land bank which issued it; and finally it is secured by the assets of every other federal land bank in the United States. The value of such a bond cannot be doubted. As long as the rains fall and the sun shines, as long as the promise of a seed time and a harvest continues, and so long as man must derive his food and clothing from the soil, such a bond will stand as the safest investment on earth.

The land bank is permitted to charge borrowers one per cent. higher rate on mortgage than the bank pays on its bonds. This represents the income of the bank out of which expenses are to be paid, reserves builded, and dividends declared. It may be in actual practice that this margin will prove to be too high and will be much reduced. This point is not of much importance one way or the other. If the income of the bank is greater, the dividends paid to the borrower will be higher, because all surplus earnings must be distributed to the borrowers. Loans are made for only certain purposes, within certain specified amounts, and for certain periods of time. These limitations are written in the bill in order to kill speculation.

The United States has not as yet passed through its speculative period. In some sections of this country the value of land is rising faster than the legal rate of interest. It is not the purpose of this bill to help the speculator, but to assist the farmer to own an average sized farm and to improve and equip the same for productive agricultural purposes. Therefore, loans are denied to any one who will not actually cultivate the land he proposes to mortgage, and who does not desire to use the money either to purchase a farm home, to improve his land, to purchase live stock or to cultivate it. No person is granted a loan less than one hundred dollars or more than \$10,000. It is believed that these restrictions will not work actual hardship on the great mass of farmers who will apply for loans; and on the other hand that they will prove an effectual bar to speculation. Thus the whole benefits of the bill will go towards the development of our agriculture, to the building of new farm homes, and to the founding of better flocks and herds. Loans are made for a period of not less than five nor more than thirty-five years. These loans are made re-payable in fixed semi-annual installments so that all payments are of equal size and include both interest and principal.

This method of repayment is known as amortization. The reduction in the debt is computed according to the principles of compound interest, so that the borrower not only reduces his debt in the amount which he actually applies on the principal, but he also receives interest upon interest. He is given every advantage of an investment in a savings institution which is officered by competent and skilled financiers. It will thus be possible under the provisions of this bill to borrow money on mortgage security and repay it, principal and interest, at a lower rate than farmers even in the most favored circumstances are now being charged interest alone. To illustrate this: When I was in Europe, farmers were repaying their loans at an actual rate of 4.85 per cent., which rate of payment included interest, principal and administrative charges. This rate, at the expiration of the period extinguished the debt. I will now make a confident prediction that when this law goes into effect, and becomes fully established, that the farmers of Pennsylvania will be able to borrow money under its provisions at a rate of five per cent. which will extinguish interest and period within the period of thirty-five years. The loans granted are unrecalled by the bank and need never be renewed and cannot be foreclosed if the contract payments are made. The borrower, however, is given the right to pay off his loan in whole or in part at any interest period. Thus, no borrower need be afraid to contract for a long period of time because he can anticipate payment at the close of any six months periods. This works no hardship upon the bank because it can either loan the money to some other farmer, or can sell in its bonds and pay them off.

I have noticed recently in the public press certain prominent individuals, one of them a president of a life insurance company, attacking the amortization feature of the bill and claiming that the American farmer does not desire the privilege of long time loans. This is but an indirect and insidious attack upon all methods of rural credit loans. The very strength of the system lies in the fact that the farmer is given an unrecallable contract running over a long period of time, reducible according to the earning power of compound inter-

est, and in individual payments small enough that they can be met out of a moderate share of the farmer's income. He thus escapes the slavery of debt; he avoids imposing privations upon his family; he is enabled to live, to educate his family and to pay for his farm. He is thus a home builder during the period in which he becomes a home owner. The man who seeks to destroy the amortization feature upon mortgages or to discourage legislation authorizing it, has no right to pose as the friend of the farmer or to speak for the progressive element in American farm life.

I have given the main outline of the co-operative features of this bill; however, I have not mentioned the principle of unlimited liability. There are two classes of loan associations authorized in the bill, one with limited, the other with unlimited liability. Just as the bill does not favor unduly either the mutual or the corporate plan of mortgage banking, but seeks to permit either to be organized under the most favorable conditions, so does it give preference to neither limited nor unlimited societies. It permits either to be organized under conditions most favorable to their success. It is my opinion that the loans will be made under one form just as cheaply as they will be under the other. There has been much criticism and I may say loose talk indulged in discussing the principle of unlimited liability. As that principle is applied under the terms of this bill, I do not believe that the individual farmer who may join such an association would incur any greater actual hazard than though he were holding a membership in an association with limited liability. I am aware that he assumes a greater legal or technical liability, or you may put it, a greater contingent liability; but safeguarded as it is, his full contingent liability can never develop into an actual liability which he will be called upon to measure in dollars and cents.

Certain criticisms have been made because the stockholders in the limited associations incur a credit liability equal to five per cent. of the face of their loans. Such critics may pose as the friends of the farmer, and may actually succeed in persuading some farmers to accept them as such; but the fact is that this is a business association; it is neither altruistic nor charitable. Co-operation, as a principle, seeks only to benefit its own members; it has no regard for the interest of non-members. It seeks to enable its own members to save; to transform savings into foundation capital; and through the earning power of capital, to give them financial independence. The members who own a co-operative association secure all the earnings of that association and in terms must assume all the risk of the business. The experience of the world is that under a well managed, honestly conducted and thoroughly supervised system of mortgage loans, there are no appreciable losses. And where there are no appreciable losses, there can be no large contingent liability. It is the exercise of good common sense for an association of borrowers who seek to secure money at low rates, upon favorable terms, to offer a security against which there can be no possible doubt. This is the only reason that capital stock is required and that credit capital is assembled. The five per cent. which the farmer subscribes to the capital of the land bank is not the money which is loaned out to his neighbor, but is a fund which is held as a guarantee and is invested in safe and attractive securities. The income upon it is sent back to the owners in the shape of annual or semi-annual dividends.

The only instance where this fund can be drawn upon by the bank is where some borrower defaults in his obligation and the association is unable to collect his obligation at law. In such an instance, the loss would first fall on the individuals and then would be distributed equitably among his associates in business. The person who seeks to encourage farmers to go into an organization whereby they are supposed to gain all the rewards and some other man shall pay all the losses, is either dishonest with himself or is trying to deceive his followers. It is an apt case where the blind is attempting to lead the blind.

GOVERNOR BRUMBAUGH: I think you will join with me in expressing our sincere thanks to Mr. Moss for this very interesting, informing and lucid address. If that is the type of men they are bringing up in Indiana on the farms, we had better look to our seed in Pennsylvania. It is a real pleasure, Sir, to have had you here, and on behalf of this great body of representative citizens, I thank you again and again. Is there any further business before the body tonight? If there is nothing more, the meeting stands adjourned.

January 27, 1916, 9 A. M.

Vice President Fenstermacher in the Chair.

The CHAIRMAN: The meeting will please come to order. We have this morning reports of Standing Committees and Specialists, continued, and first on the program is the report of the Ornithologist, Dr. Joseph Kalbfus, of Harrisburg.

DR. KALBFUS: I do not know why I was selected as Ornithologist; but I am going to make a slight report on the value of birds and the failure of the farmers to do what they ought to do for the birds. Then I am going to touch for a minute on predatory birds and insist that there are lots of such birds all around us that were not raised in nests or tree tops and never wore feathers.

I listened to an address last night on how the farmer is to proceed, how he has got to put his corn in and get money on it and all that. But he has first got to raise the corn, he has first got to get a crop, and the subject I am going to talk about, through which I believe that the man engaged in it is injured and bled to a greater extent that anything on the farm, and that in the dairy business you can raise your cattle, have your buildings and give them all the care you please, and when the time comes, you come to the creamery or some place else and your profit is all taken. It is foolish for us to sit here and talk about it and then do nothing. I am interested in a

farm up in Bradford county that came to me through inheritance—my wife's part owner; it is my unfortunate problem to run it. I get about $2\frac{1}{2}$ cents for the cream that is found on a quart of milk. I get the skim milk back sometimes, sometimes some other fellow gets it, and it is not fair to the producer and there is no use to beat around the bush; you are here to do something to better conditions, to better your own condition and to better the farmers' conditions in this State, and the sooner we consider these things, the better it will be for all of us.

My article here is entitled, "Who is neighbor to the birds?" It is well enough for the farmers to talk about what they are doing for the birds, but when you come right down to the proposition of what you have really done, it is nothing. The fact that a farmer permits a covey of quail to feed on his land, that is, that he don't chase them off, is one thing, but to do something for them in the time of need is another thing. Our quail in this State are almost gone. I have been trying in the past number of months to secure quail from Mexico. I sent an agent to Mexico at the expense of the sportsmen; I expected to have introduced in the State at least ten or twelve thousand or more quail; day before yesterday I got a wire from Washington stopping the shipment of quail because they had a disease called Coxidosis, that is extremely contagious and almost always fatal. I had one importation of about 175 come in to New York about four weeks ago; there's 16 of them alive to-day. I had another importation that came in three days ago, and 77 of those died the first day. The intestines are covered with ulcers and the liver with white bloches that is infectious to the extreme with quail. It does not apparently affect other birds, and the time has come, as I said in my last report to the Commission, that if we are going to preserve the quail, there must be a closed season, and that does not mean simply that the farmers are going to go along as they have done; the farmers are the ones that are really interested, and I am going to touch on this subject in this paper.

I am going to just stop a minute to say that it is not the quantity of birds we have; it is the variety of birds, each doing a work for the farmer in its special place, in its own peculiar way that the other birds cannot do, something that means something to every one of us. The wren, the robin, the different birds doing their own work; the robin in the Springtime taking insects and the larvae of insects chilled in the furrow, doing something that saves the farmer incalculable cost. Yet the minute the cherries begin to turn or his berries begin to get ripe and the robin comes to get a little something, he is out to soak him. The laborer, being worthy of his hire, ought to be considered with reference to the bird. I know it is aggravating to have your strawberries or cherries picked, but the robin is doing something for you in his place that, if he did not do it, no other bird would.

Dr. Kalbfus then presented the following paper:

REPORT OF THE ORNITHOLOGIST

By DR. JOSEPH KALBFUS

Who is Neighbor to the Birds?

For many years those who have investigated and understood the value of the lifework of birds have been striving to have the people around them understand this matter as it should be understood. Through pamphlets, illustrated lectures, and in various other ways, this matter has been persistently called to the attention of our people, so that the value in dollars and cents that comes through the presence of this or that species of birds is so well understood that I need not dwell upon it at this time. The great majority of birds are our friends, the value of the lifework of this family or that species is undoubted, each in its own place is doing something for us, especially for the farmer, the value of which cannot be expressed in words or figures.

Experience teaches that a little kindness, either in word or deed, has its effect upon wild animals and birds, just as it has with human beings or with domestic creatures. Without this kindly attention the birds are apt to drift or be driven from us, to our great disadvantage. What have we done, either to attract these feathered friends or to keep them with us? The fact that I may permit a covey of quail or a flock of other birds to feed upon my premises, or at least to not drive them away, is not feeding the birds; they have done me more good than I have done them; they have at least cost me nothing, and I am afraid that many of us are not doing for the birds what we should do, and I only wish I had the power to say or do something that would cause the farmers of this State to realize the true position they occupy regarding this subject. When the farmer, the farmer's wife, his sons and his daughters, do for the birds what they can and should do, then, indeed, can it be said for the birds, "The winter is over and gone and the voice of the turtle is heard in the land."

I know the many turns the farmer and his family are required to make each day; I know how all his time is taken, and when I say that but a few farmers do anything for the birds around them, I intend to make only a plain unvarnished statement of fact, and not to be offensive. I happen to have spent some considerable part of my life in the country, and say what I do after a careful canvass of the question extending through a series of at least forty years. To my mind, the farmer has not been neighbor to the birds; I know of but few farmers who, unless they were also sportsmen, have ever done one thing to attract the birds, either game or otherwise. Upon the other hand, they have done much to injure and drive the birds away, and how have they done this? The old tree filled with woodpecker holes in which the hairy and downy woodpecker and the chickadee and the nuthatch found winter homes, and in which the bluebird and many other early Spring migrants found shelter from cold and sleet, have been long since transferred to the farmer's wood-

pile, and have gone up in smoke through his chimney. Through the practice of tree surgery, the trees in the orchard or on the lawn have all had the decayed places cut away, and the cavities filled with cement, so that the birds before named have no place into which they can retreat in time of need. They, therefore, freeze and die, and the farmer, if he pays any attention at all to the subject, wonders what has become of the birds, and I wonder how many farmers in the State have attempted to put up bird-houses to take the places of the shelters destroyed. I wonder how many farmers in the State have hung out suet, or fresh meat, or other food for the winter birds in the time of necessity. How many of your farmer friends, unless they were also sportsmen, have ever traveled through storm and sleet to find and feed a covey of starving quail, as many sportsmen have done, or who have ever put up good hard-earned dollars as many sportsmen have done for years, to buy quail in other states and place them in this State.

An undoubted friend of our birds, Dr. William T. Hornaday, one of the great naturalists of the world, and Director of the New York Zoological Park, in writing upon this subject, among other things, says: "Show me one farmer, or forester, who goes out of his way and labors and spends money to protect his feathered friends and I will show you ninety-nine who never lift one finger or spend one penny a year in such work." And again, "If there was anything I could say that would penetrate the farmer's armor of indifference, and sting him into activity on this subject, I would quickly insert the stinger, even at my own cost and loss." And, again, "Did you ever know a real sure-enough farmer to subscribe to a fund for game protection or to spend time and money in attending legislative hearings in behalf of bird protection and increase? I never did; I mean the real farmers who depend upon their crops for their bread and butter."

Dr. Hornaday was born and raised on a farm in Iowa. He knows something about the disposition of farmers; he knows that because of their many and varied duties the majority of farmers have no time to even think of the birds; his whole life has been spent in a battle for the birds. He has come before the legislative bodies of many states in the interest of birds, and it would not do for him to tell anything but the truth about farmers. He knows there is not one farmer in fifty who can tell the names of half the birds around him, or who knows of the special work each species of birds is doing for him. Dr. Hornaday would hardly attempt to "slur" himself or his people, or to "joke" regarding one of the most serious questions he has been called to consider in his lifetime, and the sooner the farmer realizes his true position the better it will be for him, and for the birds. Don't, I beg of you, get cross at me because I dare to tell you the truth regarding this matter.

Someone will assert that birds were more plentiful years ago, when no one even thought of the birds, than they are at this time. This is no doubt true, but if that person will investigate they will find that in the days when birds and game and predatory creatures were plentiful, men were scarce, and had not taken the homes of these wild creatures as they have today. In those days the wild creatures had plenty of land on which to roam, and untold numbers of hiding

places; their feeding grounds were without limitations. Today, in highly cultivated sections, the majority of our birds are compelled to nest upon the ground or upon low bushes, within easy reach of their many natural enemies, to the great discomfort of the birds. The farmer's cat, his dog, his reaper, his mower and horse-rake, each one get in their deadly work; his cows, his horses and sheep tramp out the nest in the pasture; forest fires, built by human hands, take their toll, especially Spring fires, that not only destroy the nests of birds, but also the young of the birds and animals, and in addition destroy the trees and vines and shrubs that furnish the food for all wild creatures, when insects are gone. The swamp has been drained, wherein the covey of quail or other birds were wont to take refuge at eventide on a tussock, safe from prowling enemies. The farmer's cat, it is estimated, kills at least sixty song birds every season, more birds than are killed by any five hundred hunters in the State, excepting boys, for true sportsmen never kill song birds. Crows are permitted to hatch and increase everywhere. The farmer never thinks of the crow, except when he is pulling corn, and for destroying birds the crow beats the cat out of sight. Young crows, in the nest, are said to consume daily animal food equal to two or three times their own weight, and the eggs and young of birds are taken by crows whenever found. This disposition of the crow is what drives many birds to seek nesting places near human habitations, and causes the robin to build on your window sill. And the great wonder to me is, not that we have so few birds, but, instead, that we have birds at all.

In Wyoming last winter, and for several winters past, the utmost effort of the United States Government has been put forth to save the lives of thousands of elk dying from starvation, because settlers had taken their winter feeding grounds for farms. Elk were plentiful there, for no man knows how long, and none starved; today they must die because their winter feeding grounds have been appropriated to the use of men, just as the homes of our wild creatures of various kinds have been taken here, and still we wonder why the birds have decreased.

This much for the birds that are useful, now just a word about certain other birds.

In my paper read at the time of our last meeting, under the title "Predatory Birds," I attempted to call to the attention of farmers to the fact that all birds as I know them were not raised in nests in the tree-tops, neither were they covered with feathers. Aristotle, in the long ago, in describing man, said he was a biped without feathers, indicating to my mind that even in his day there were birds of various kinds and that old philosopher had been up against some of them. In my last paper, I attempted to call attention to the fact that in my opinion a matter of very grave importance was the manner and the channel through which the products of his farm reached the market. I especially called attention to the method of testing milk in creameries for butter-fats, and the unfair manner in which the skim milk was returned to the one who produced the milk. Since our last meeting, I have examined into this matter to a further extent, and believe that nothing that can be done by the dairyman on his farm will overcome the leakage and loss at the creamery. I am satisfied that a real bird of prey, in so far as the dairy is concerned,

is perched on the lentel of many of the creameries operating in this State, and it makes no difference whether the loss be brought about through negligence or carelessness, or with malice aforethought upon the part of the creamery employees or owners, the loss to the dairyman is just the same, and the reason why the check is short, if it is short of what it should be, means nothing to him. Three-tenths of a point off the correct test to the ordinary farmer takes the greatest part of his profit, and five-tenths takes it all, and as I understand it, it is extremely easy under the system of today, to lose his profit in just this way.

These conditions are so evident to any one who chooses to investigate from the standpoint of the producer, that in several states steps have been taken to overcome these wrongs, and official examiners are provided for by law, and it is made the duty of such official to visit frequently at unexpected times, every creamery in his district, to take samples of the acid used and of milk from dairymen, and to make tests under varying conditions, so that as nearly fair and just conclusions can be reached as may be possible.

Why should this not be done in Pennsylvania? What is the benefit to anyone in keeping clean stables, with cattle up to the standard every time, only to be robbed later on by the middleman? It seems to me this is a matter well worthy of serious consideration, and that some plan through which these wrongs may be corrected should be conceived and put in operation as quickly as possible. To my mind, the farmer alone is the man to do this, men who understand existing conditions and what is necessary to correct those conditions. The profitable work of "farmifig" farmers has grown to be quite an industry, and if this task is entrusted to men other than practical men in this line of work, there is no telling what the result may be. Have you ever considered that of the many laws upon our statutes, today supposedly conceived by farmers and passed at their instance and in their interests, there are but few that in reality help the farmer as much as they help the other fellow, and not one that even pretends to protect the dairyman. Farmers, as a class, are not perhaps, because of their secluded life, as fully in touch with and as wise to all worldly ways, as are some others. Some farmers I will admit are fairly well halter-broken in this direction, and have earned the method of selling a horse "that will stand without hitching," but the majority need and deserve to be told the truth and the whole truth every time; they deserve to have thrown around them every protection accorded other men. Let the Legislative Committee of this organization think this matter over.

The CHAIRMAN: Discussion of this excellent report will be in order.

MR. DeWITT: I don't like to be too conspicuous on this floor, but that was a remarkable paper, inasmuch as it told us so much truth. I read sometime ago a report of some gentleman like the Doctor on the bird question, saying that if the birds were all out of existence for five years, we could not raise a single crop in this country. I would be in favor of devising some way whereby the birds could be protected. His speaking of the quail reminded me of an incident. When I went up to my farm I frequently passed an old

quail with her young; it was a sight to see them. That Fall, last Fall a year ago, a man who hunts found this bunch of quail and he bragged to me that he got twelve of them at one shot. I said, "It's too bad somebody didn't get you."

In speaking of the creamery part that the Doctor gave us, I don't know when I have heard anything that has pleased me more than that, because that is something that I am directly interested in. I made a few statements yesterday in that regard; but this the Doctor has got so that it is, in my judgment, absolutely true, and something ought to be done to protect us, as milk producers. In my remarks yesterday, I made the statement that 40% or 60% of the money that was appropriated for road purposes did not get to the roads. The Department says that the per cent. is too large. I don't know; I made that statement from something that I had read in some report; I think I can find the report, if it would be necessary to produce it.

While I am on my feet, in speaking upon that subject, I wish to say that the Highway Department agent in our district has made some good, substantial improvements, and the dirt roads that he has worked and kept log-dragged were last year, taking into consideration the wet season, very good. There has been a marked improvement in the road question in our county since the Highway Department took hold of it. One of the speakers yesterday, in speaking of the supervisors in the county,—the supervisors of our township roads, in a great many instances throughout the State could be improved upon, especially in Tioga county.

MR. SCHULTZ: The report we had from the Doctor is an excellent one and it reminds me of this, also the remark that Brother DeWitt gave out on the creamery question—I believe the farmer must look out for himself to a certain extent. If he wants to go the easy way, the other man will come of course and do the work for him, but he always wants good pay for it. Now in our county, (Montgomery) right where my farm is, where I live and where I have farmed for thirty years, we started a co-operative creamery years and years ago, and that creamery is in existence to-day and is flourishing, as it were. That creamery is conducted by the farmers; the farmers own it and operate it, and they are doing splendid work, and that is what the farmers ought to do all over the country. Some of those things they can do for themselves, but if we let the other man do it, he is willing to do it but eventually he gets the upper hand of us and he will do just what he pleases regardless of us. It is always up to us to manage those things. If we do our part, we can take care of it.

MR. BLYHOLDER: We have had the privilege of listening to that most excellent report and have learned what others are doing to protect the birds for our benefit. Now it seems to me it is time for us to speak; I, therefore, move that this Board favor a closed season for the quail, or Virginia partridge, until such a time as they become so plentiful as to make it necessary for the season to be open.

MR. BOWN: I heartily second that motion because I believe that we must, in Pennsylvania, protect the birds. I have tried to protect them on my place, but at the present time there are very few quail on my farm. They come to my garden and pick up lots of worms that

otherwise would destroy my vegetables, and I do not think that this Board could do a better thing for the farmers of Pennsylvania than to close the season on quail. I heartily endorse Brother Blyholder's remark.

The CHAIRMAN: Wouldn't it be specific to mention a time?

MR. BLYHOLDER: Yes, until such a time as it becomes necessary to open it.

Mr. BOWN: I would say five years, if Brother Blyholder will accept that amendment to his resolution.

MR. WEIMER: I would like to get away from the motion a few minutes to bring something up before this Board in regard to the report of Dr. Kalbfus. In the first place, I suppose a good many of the older members know that I am daddy of the Hunters' License Act, and I will refer to that in a moment. Dr. Kalbfus is a little hard on the farmer, and all he has to be reminded of is, that for fourteen years the hunters tried to get an act passed through the legislature increasing the hunters' license, and it was only after I came before this body and got the consent to the passage of an Act of that kind, that it was passed. If you look up the records of your Board, you will find that to be a fact. If you remember, when I got up and spoke about tagging the hunter, there was quite a laugh went through this body; but after you gave me permission to explain that matter, we took a vote and I believe there was only one dissenting voice on that question.

Now I am a farmer from A to Z; I am also a sportsman, and, gentlemen, I want to be fair to both. If you will pardon me for taking up a little time, because no man is more interested in wild life than I am, in forestry, but I want to be fair, I want you to understand, gentlemen, that the farmer is doing nothing in a financial way to protect the game of this State. When we had in that Hunters' License Act, a provision to charge everybody \$1.00 per hunter, it was only possible to get the measure passed by eliminating the farmer from the payment of that \$1.00. And, gentlemen, that is not fair; the game does not belong to the farmer; the game of this State does not belong to the hunter; it belongs to the Commonwealth. While we own the land on which the hunter goes to hunt, that does not mean that we can go there and hunt ourselves at the expense of the hunter who pays his dollar. Now I think that every farmer should pay his dollar license and not accept charity from the licensed hunter. Then he would be in a position to post his land and do it without any feeling that he is robbing the hunter.

As president of several game protective societies and the Wild Life League, I receive letters something like this: "Won't you try to persuade the Game Commission to send us twenty-five quail or twenty-five pheasants to introduce on our land and we will promise to post our land and get all our neighbors to post their land to prevent the hunters from hunting on that land." Think of it, asking the State to take money to buy pheasants to put on their land and they, in turn, will then post that land and prevent hunters from hunting on it. That is not fair and I want to ask that gentleman to withdraw his motion and allow me to make a motion that we favor an

amendment to the Hunters' License Act to cut out that exemption of the farmer from the payment of the tax of \$1.00, and place him on a par with the hunter so that he can talk about the protection of game and the closing of the hunting season. In our county, (Lebanon), the hunters have voluntarily agreed not to hunt quail for five years, and they are asking the farmers not to hunt quail. Now you see the practice was for the farmer to post his land, shoot the quail and rabbits and then sell them on the market. The result was that there was an amendment to the Act prohibiting the sale of rabbits.

A good many farmers object to that clause because they feel that they ought to be allowed to kill the rabbits because the rabbits belong to them on the farm. And they feel the same way about the birds. Now the rabbits do not belong to the farmer any more than they belong to any sportsman. They would belong to the farmer, more so, if that farmer had paid his dollar, because he would be on a par with the man who had paid for those animals. Why should not the farmer kill rabbits and sell them? Because, the minute he kills rabbits, he posts his land and kept hunters off of it. I would be in favor of an amendment providing that any farmer who posts his land should not be allowed to kill a rabbit, but any farmer who did not post his land could kill rabbits. The Grange passed a resolution in favor of the protection of birds, but they were not in favor of the clause enacted by the last legislature prohibiting the sale of rabbits. Now, gentlemen, that is a question that the farmers have nothing at all to do with until they pay their \$1.00 the same as the sportsmen, because the sportsmen's money is protecting the game of this State. You must be fair. Thank you for allowing me to take up this time, but I think it is a matter we ought to think over thoroughly and not become objects of charity.

The CHAIRMAN: The question is on the protection of quail. State your motion again.

MR. BLYHOLDER: My motion is that we favor protecting quail or the Virginia partridge, making a closed season until such a time as they become so plentiful that it will be necessary to open the season again.

MR. BARNES: I do not want to get into any controversy with the gentleman who has just left the floor; but I want to say that I come from a county where possibly as much license money is obtained from hunting as any other county in Pennsylvania, York county, and we have very few farmers that shoot any partridges at all, and that is because the land is posted in our county; it is the fellow that pays the dollar and goes out and runs over my 196 acres and everybody's elses, and gets twenty or twenty-five rabbits a day, as he used to do, and takes them to the market and sells them and usually buys a quart of whiskey with the money. (Applause). I believe in being fair, but if you find a dozen farmers or a dozen men on this Board who are farmers, who are favorable to putting any more taxes on the farm lands of this Commonwealth, I wish they'd stand up. I feel that the farmer furnished the material for the hunter to hunt on for a number of years, and if the game belongs to the sportsmen, let them take them to the town and feed them. We feed them

all through the year when it is out of hunting season, and during the hunting season we are busy on farm work, and the sportsman comes in and shoots our birds while we are husking corn. It is an outrage to think that we farmers should be charged \$1.00 if we want to go out and kill a rabbit for our family.

MR. BOWN: I heartily endorse every word that Mr. Barnes has said. Take the average farmer and he is a very busy man. This last season I had but one half day to go hunting and I got one rabbit. I won't kill any quail on my farm and won't allow anybody else to kill them. I don't take out a hunter's license, because I have the privilege of hunting on my own farm, but I don't hunt except to kill a rabbit now and then, and I am bitterly opposed to taxing the farmers for a license for hunting on their own farms.

MR. WEIMER: I do not want to get into any controversy with that gentleman over there, but I would like to have this motion amended so that we co-operate with the sportsman, not make it a movement of this body, but I would like to have that motion amended so that we go on record as co-operating with the sportsman to close the State to hunting quail for five years.

(Amendment seconded.)

The **CHAIRMAN:** It has been moved and seconded that this resolution be amended as stated.

MR. BLYHOLDER: Mr. Chairman, I am opposed to the amendment.

MR. WOODWARD: I would like to ask what is the amendment.

MR. WEIMER: Mr. Blyholder offered a resolution that we favor the closing of the State of Pennsylvania for five years.

MR. BLYHOLDER: No, no, let the Secretary read the resolution.

ASST. SECRETARY WELD: Moved by Mr. Blyholder that this Board favor a closed season for the quail or Virginia partridge until such time as they become so plentiful that it is necessary again to open the season.

MR. WEIMER: My amendment was that we go on record as saying that we will co-operate with the sportsmen's organization of this State to have passed an Act of that kind. They are the men who are paying the expenses of this.

MR. BLYHOLDER. Oh, no.

MR. WEIMER: Their money is used for the propagation of the game; you cannot get around that. All you have to do is to look at the records; over \$600,000 is collected from them.

MR. BLYHOLDER: From whom? From the farmers?

MR. WEIMER: Oh no, don't say that.

MR. KILLAM: My reason for seconding that amendment is this; to co-operate with the sportsmen's clubs throughout the State. We have a sportsmen's club in Lackawanna county, and they are spending a great deal of money for the propagation of game and game fish and re-stocking streams. They are spending their own money and nobody else's; they are not going out asking the farmers for a dollar through all these northern and eastern tier of counties, not asking the farmers for a dollar, and there's a good many of the farms they don't hunt on.

A Member: I think the original motion of Mr. Blyholder is all right, but he should specify a time. If Mr. Blyholder will amend his motion by specifying a time—you see in one part of the State, the quail may be very plentiful and in others, not; specify a time, and when that time arrives, if necessary it can be extended.

MR. BRONG: I move that the whole proposition be referred to the Committee on Resolutions.

MR. WEIMER: There is a motion already before the House and an amendment to that motion and the amendment has been seconded.

(Mr. Weimer's amendment was then voted on and lost, after which Mr. Blyholder's original motion was adopted.)

ASST. SECRETARY WELD: The office asked me to make two announcements this morning; First, those of you who have not responded to the roll-call and who know that I have not checked your names, please give me your names so that I may check you up as having been present at some of the sessions of this meeting; and, then, again, in regard to the expenses, the Department pays the traveling and hotel expenses of the members of the Board and the Specialists. Vouchers for these expenses will be mailed to the home address of those members whom I have checked as being present, after you get home. The voucher is a new form of voucher; make it out giving the distance from your home to Harrisburg in miles and the amount of money under the column of railroad fare, for instance, and then further out, if you come by sleeper, put down the sleeper fare under its column, and then the hotel expenses here at Harrisburg, with a receipted bill attached for your hotel expenses and then the expenses of your return trip back home, your mileage and sleeper, add the whole thing up and send it in to the Department. It is not necessary to execute the affidavit on the back of the voucher; you are not required to do that.

MR. HUTCHISON: And include any meals.

ASST. SECRETARY WELD: Here is a column for meals.

MR. HUTCHISON: And make it out with indelible pencil or ink, so it can be copied.

MR. J. ALDUS HERR: If I am not intruding, I would like to have a minute or two to introduce a motion. I present to you a motion for the Board. It is a matter of common knowledge that the existence of the State Board of Agriculture on several occasions

has been threatened and even its abolition determined upon. Therefore, in view of the fact that during the trying period of the Pennsylvania State Agricultural College and in the early days of the Department of Agriculture, when both of those institutions needed defenders, boosters and assistance, this Board, because of its character, the stability and the reputation of its members for honorable and fair dealings with the farmers of the State, was able to obtain appropriations for the maintenance of both these institutions and which stand today as monuments to its wisdom; therefore, with so splendid record of achievement, and that these benefits may be continued and even enhanced, I move that a Committee of five members of this Board, including the first Vice-President as its Chairman, be appointed by the Chair to draft a bill for presentation at the next legislature of 1917, defining the duties and authority of the members of the Board in the counties they represent and establishing a direct relation between the State Board and the Department of Agriculture; defining the authority to be exercised by the members of the Board with the Department, and that this Committee shall report to this Board at its next annual meeting.

(The motion was seconded and adopted.)

MR. WEIMER: In looking up some of the old records, you will find that in 1851, I think, there was a Board of Agriculture established and they were to act as an Advisory Board to the Secretary of Agriculture. For my part, I cannot see the advisability or necessity of having the Agricultural Commission. (Cries of "Right.") Our Governor is talking so much about economy and efficiency, and I would like to make a motion that the position and the duty of the Agricultural Commission and of the Agricultural Board be referred to the Committee on Economy and Efficiency, which is paid to look into the matter, and that they be requested to make a report at our next meeting. Why this State should pay for an extra body of men to come together when this body here was primarily created to do that work. And this body is a representative body, it comes from every portion of the State while, from necessity, the Agricultural Commission cannot do that because there are only a few members, and the Act of 1851 and the supplementary Act of 1879 is very carefully drawn up and it is made in very good English, there is no doubt about it at all, and if you read it over, you will see that the Agricultural Commission—I believe that is what they call it—is illegal, they have no standing.

COLONEL WOODWARD: The gentleman used a phrase like this, "The Agricultural Commission and the Agricultural Board;" I think probably it was a slip of the tongue, but that Agricultural Board might be misinterpreted to read "Board of Agriculture."

MR. WEIMER: Well, I will ask the Secretary to use the proper terms, because just at this moment I am a little confused as to the proper title.

(Motion seconded.)

The CHAIRMAN: The motion has been seconded.

ASST. SECRETARY WELD: I will get Mr. Weimer to repeat the motion.

Mr. Weimer, I will write it out and present it at the afternoon session. Then, with your permission, I will withdraw the motion for the present and make it this afternoon.

The CHAIRMAN: The Chair will appoint on this Special Committee, on the State Board, J. Aldus Herr, of Lancaster county, Frank Ranck, of Fulton county; R. J. Weld, of Warren county and E. A. Studholme, of McKean county. They will meet at the call of the Chairman, Mr. Herr.

MR. JOEL A. HERR: I would like to make a remark in regard to the economy of the work of the Board of Agriculture. I think the whole appropriation granted to our work for the entire year, over the entire State, is four thousand dollars, and I do not think that is always used up. This has been the one board, the one body, that has worked for nothing, and boarded itself. Usually, I think that is about the history of it. The Department of Agriculture was called into existence quite a while ago; the Board of Agriculture was managed by Secretary Edge, and the members, at that time, had less than half the expense that accrued just as soon as the Department was created. Now I am not going to criticize the Department, but I want to say that if you want to cut down expenses and talk economy, cut out those fellows who have some money to spend and let the fellows who haven't really had anything to spend, let them alone, they have done a noble work, they have done a work of sacrifice that no other body in this State has ever done. They have spent weeks and weeks of their time, virtually serving the agricultural public for nothing, and now the idea of removing the little pittance they do have reminds me of the story of the boy who saved the man from drowning, and when he dug him out, the man turned around and threw the boy in and drowned him. (Laughter and applause.)

(Vice President Blyholder took the Chair).

CHAIRMAN: Next on the program is the report of the Meteorologist, Prof. W. G. Owens, of Lewisburg.

Prof. Owens then submitted the following report:

WEATHER OBSERVATIONS

By PROF. W. G. OWENS.

We seldom realize that we are living at the bottom of a great ocean of air. How high it is, that is how deep this ocean is, no one knows. Various methods have been used to measure its depths but the best leaves large chance for conjecture. The length of twilight has been used as the basis for this calculation, on the supposition that twilight is caused by the reflection of sunlight on the dust particles in

the higher atmosphere. The height at which meteors become visible has also been used as a basis of calculation. This height can easily be determined by two astronomers who decide to measure the angular height of all the meteors which pass between them. If they each see a meteor at exactly the same time moving in a certain direction, it is likely to be the same meteor. Then knowing the distance between the stations, it is easy to calculate the height above the earth when first seen. But through how many miles of air has the meteor travelled before the friction made it hot enough to glow? That no one can tell. From one to two hundred miles may be put down as the depth of this ocean of air. Yet one-half of its bulk is within three and one half miles of the sea level. That is why the air is so rare on a mountain top that exertion brings on speedy exhaustion.

The air is so mobile that only when it or we are in motion do we notice its presence. It is so evenly distributed that we do not realize that it has any weight. When Torricelli first advanced the theory that air had weight, the idea was laughed at as being the height of absurdity, and his friends feared that he was losing his mind. They thought it absurd to suppose that the weight of the air could force the water up a pump stock, but that the water followed the valve because "Nature abhors a vacuum" was perfectly good logic. Even the great Pascal seems to have had grave doubts that the air had weight, but he realized that the fact could be proved or disproved by taking a tube closed at the upper end, filling it with mercury and placing the lower end in a cup of mercury. This instrument he had carried to the top of a mountain near Paris. As the instrument was carried up, the mercury descended in the top as it was brought down the mercury went up again. This Pascal concluded could only be caused by the weight of the atmosphere pressing on the mercury in the cup. Since the date of this experiment it has been acknowledged that the air has weight, hence must cause things which are immersed in it to become lighter by the weight of the air displaced.

The fact that the air has weight enables it to carry water in the form of mist and cloud and invisible vapor. It makes rain and snow possible and causes moisture to be carried to almost all parts of the earth. The only places where there is no rain are such localities as are deprived of it by local conditions. Deserts are generally due to mountains which rob the winds of their moisture as they pass over them.

No one factor has more to do with the prosperity of the farmer than the atmosphere unless it be sunshine. What causes the changes in the atmosphere? Why do we have rain today and sunshine tomorrow? Why is one summer wet, as the one which has just passed, and another dry? What makes these changes? These questions have come into the minds of men since the earliest times and yet they are still waiting for an answer.

In order the more thoroughly to study and understand the phenomena connected with the atmosphere, weather records have been kept for many years. At first by a few men now by many in all parts of the world. There is no part of the earth today in which the wind currents, storm and weather changes are not recorded and kept so that they can be compared and if possible a science created by studying these isolated facts.

In the United States there are about 200 meteorological stations with paid observers and the best instruments that science can furnish. Observations are taken several times a day and many of the instruments are self-recording so that a continuous record is kept. More than three thousand (3,000) voluntary observers every day make a careful record of the weather, and at the end of the month send it to the Weather Bureau. Here the records are compiled and classified and kept for future study. This work is duplicated the world over. All this is done so that by studying these data man may be able some day to learn the laws which govern the weather and be able to foretell the weather just as an eclipse of the sun or moon can now be foretold.

A beginning has been made. We know many points about the trade winds; the nature and force of monsoons, land and sea breezes, and many other phenomena have been worked out until they are fairly well understood.

Four great storm centers have been established. One in the West Indies and extending along the eastern coast of the United States. A record in the Philippine Islands and reaching into the China Sea. A third in Samoa and the Fiji Islands and the fourth at Mauritius.

Again we have learned that the wind does not move in the direction that the storm is moving but moves in an arch. In the northern hemisphere counter-clockwise or from right over to left, while in the southern hemisphere it rotates in the direction that the hands of a clock move. By noting the direction and change in the way the wind is blowing, it is possible to tell on which side the storm center is passing. This fact is used by sailors to keep out of the storm center.

Some stations make observations in the higher atmosphere. Sometimes kites are sent up which carry self-recording instruments. These determine temperature, pressure, wind and humidity. Sometimes the kites have steel wires to hold them so that they can go up about a mile. At other stations small balloons carrying instruments are sent up. These have been known to reach an altitude of 15 miles, which is more than twice as high as man has ever been. These instruments are marked so that anyone finding them will send them through the post office to the sending station. While many of these are never heard from yet many come back and tell their tale of adventure far above the clouds.

These inquiries in the upper air have revealed many peculiarities which were not suspected. Most of these, of course, will be of more value to the aviator than to the farmer, but they may result in our learning what causes rain and changes in the weather, as well as wind and frost. When these observations are used in connection with the weather records, they may enable some master mind to outline the laws which govern the weather.

A beginning has already been made. The storm centers which begin between the Equator and 25 or 35 degrees north latitude move west, then north, then northeast with increasing velocity till they reach about 65 north latitude when they generally have spent their force. Little is known of the storms in the Arctic Zone. The storms that affect us most originate around Lake Superior and move down

the St. Lawrence and spend their force in the interior of Russia. The great whirls which are called general storms are supposed to be caused by polar and equatorial currents. They cover large areas, move slowly and take many days to develop. Small storms called tornados or cyclones, sometimes causing waterspouts generally visit limited areas and sometimes do great damage. From what has been said it is seen that many people are working on the weather problem. Predictions are sent out by the Weather Bureau forecasting the weather for 24 or 48 hours. These are every year becoming more accurate. Yet in certain localities they often fail. This may be due to local conditions which the farmer might, by observation, be able to determine and so by the help of the Weather Bureau's forecast be able to predict the changes which were likely to follow.

The CHAIRMAN: Is there any discussion of this report? If there be no objection, the report will be entered on the records. Next on the program is the report of the Apiarist, Mr. H. C. Klinger, of Liverpool, Pennsylvania.

Mr. Klinger submitted the following report:

REPORT OF APIARIST

By PROF. H. C. KLINGER

The year just past has been a failure in the production of honey in this State, and almost the same throughout the whole country. Everywhere there seemed to be a profusion of flowers during the season, but the wet and cool weather prevented the secretion of nectar. The timely help of the Asters late in the Fall in some of the sections of the State saved the expense of buying sugar for Winter feeding. Where these flowers did not exist, colonies had to be fed to keep them from starvation. This is the second year of failure in succession, but the average bee-keeper is always hopeful and already sees indications of a good crop in 1916. The wet Summer started an abundance of clover, and the moderate Winter weather which already gave two flights to the bees both point to a successful Summer.

At present there is possibly no subject so absorbing and perhaps alarming to the apiarist as the bee diseases now so prevalent and virulent in the State—that of American and European Foul Brood. Notwithstanding the fact that the State inspectors have been waging war against the spread of the diseases, the scope of their work is so large that it will require several years before the State is under entire control.

Thousands of colonies have been inspected during the year, and in a number of counties where the disease was not known a year ago, hundreds of colonies in as many apiaries were found infected and many in a hopeless, rotten condition. Under present conditions no one can feel safe that one or the other form of disease will not make its appearance any time during the season.

The European type is known to have spread over a distance of more than 50 miles in a single season. It is absolutely important that every bee-keeper becomes informed with all available knowledge pertaining to the subject and stands ready to combat the disease on its approach. As in the fight against the San José scale that infected the fruit trees, those who were willing to be guided by knowledge and led by instruction came out of it with healthy trees and fine wholesome fruit; and it seemed that their trouble was a blessing in disguise; so we hope out of the fight against these diseases we may come with better bees and apiaries, greater efficiency and larger profits. Of the two diseases, the American type is perhaps the most difficult to treat; yet the European is the most to be dreaded on account of its rapid spreading in an apiary, and then into neighboring apiaries and surrounding centers of infection, and the rapid decimation of a colony attacked.

The causes of the spread of the diseases may be summed up in two words: Ignorance and carelessness; not ignorant stupidity, but a lack of knowledge of the form and manner of the diseases. Many persons think their bees died from starvation, "froze to death," or the "worms killed them," when, if the facts were known, it would have been found they died from infection of one of the brood diseases.

The means of dissemination are several: The shipping of bees, or moving them from one place to another; the sending of queens in cages which contain food mixed with infected honey; and often honey cans, section boxes and other containers are thrown in garbage places where bees will find the infected honey and carry it back to the hives. Undoubtedly the most serious way of infection is that of robbing out a weakened colony. Sometimes a quiet robbing takes place that only an experienced person will detect. It is a question much under discussion at the present that the European type, on account of its rapidity in spreading, is carried by the bees on their bodies to the fields, and flowers and other bees coming in contact with the same flower may carry the germs back to other colonies in the same or other apiaries. This is thought probable also from the fact that diseased larvae from the American type are never touched by the bees, while under favorable conditions they will clean out the diseased larvae of the European type. So that in trying to rid their own colony of the infection they may throw the germs outside of their own hives or carry them to the fields.

For curing the disease there are several methods given in journals, State bulletins, and by the inspectors. It would lengthen this report to go into details. One fact has been confirmed by all authorities: That black bees more readily succumb to the disease than do the Italians; and, also, where vigorous Italian queens have been introduced into infected colonies a permanent cure has been effected without any further operation.

Morley Pettit, the Provincial Inspector of Ontario, Canada, says, "The cure for American Foul Brood is only permanent when pure bred Italian queens are introduced by all black or hybrid stocks." "Pure bred Italian bees of vigorous stock are almost immune to European Foul Brood."

If the State expenditure shall be of the utmost benefit, it is of the greatest importance that the State receive the co-operation of

every man whose interests are touched. The remedy for foul-brood is in harmony with the best system of bee-keeping that must be followed in order to obtain the greatest success, even if there were no diseases. "Keep bees better and keep better bees."

The CHAIRMAN: Next is the report of the Economic Geologist, Mr. Baird Halberstadt. Is Mr. Halberstadt in the room?

MR. HUTCHISON: He just stepped out a moment ago.

The CHAIRMAN: We will proceed with the next report; the Agricultural Geologist, Mr. W. H. Stout, of Pinegrove. (Applause).

MR. STOUT: Mr. Chairman, Ladies and Gentlemen, Members of the Board: This comes rather unexpected and of a sudden, and I have hardly had time to collect a few sentences to begin my discussion. I am very grateful for the favors that have been shown me by the members in continuing me as one of the specialists up to this time and re-electing me again, for which I thank you very much. Without wasting any time, I want to take up the topic, and before doing that, I wish the members, the newly elected members and the older members also, would just refer to the program and read the legislation creating this Department or this Board of Agriculture, and familiarize themselves with the law. It states very distinctly what its duties are and also that they shall meet here annually at this time; and it is a Board created by the Legislature of Pennsylvania, and while efforts have been made to abolish it, it cannot be abolished, unless the law is repealed that created it, and you people take this along home with you and stand up among your people, among your home people, and support the continuance of this Board, because I believe it is the best thing that we have had yet in our agriculture in this State. (Applause.) When I was home, I looked over some addresses by prominent people and I found it a common thing for these prominent public speakers to have a sort of a preliminary address, a few introductory remarks, so I prepared a few introductory remarks to offer on this occasion. I headed it, "Cornfield Philosophy and Soothing Syrup." (Laughter.)

Mr. Stout then presented the following report:

REPORT OF THE AGRICULTURAL GEOLOGIST

By MR. W. H. STOUT

Obedient to a summons to appear here at this time to give an account of my stewardship since we met last, I present some thoughts on a topic which may not contain anything of interest or value.

There is this consolation in the knowledge that it costs each one only about fifteen minutes, or less time than is often consumed wait-

ing for a car or for desert at the dinner table. Also some of those present on the State's pay roll receiving one to four cents a minute while here can rest in contentment, and others can rest, digest and assimilate the meals for which the State pays. Differing mentally and physically, we do not see things in the same light or from the same point of view; so if none agree with the sentiment in the following discussion is only proof that majority may be wrong and the minority right.

There are no two things exactly alike in nature, in the vegetable or animal creation, the human race being no exception. A very prominent orator, statesman, politician, peace propagandist, editor and agriculturist related this story during a political campaign: "A farmer hurrying a load of hay from a field before an approaching storm, had part of the load slip off which was reloaded, another start made and after going a short distance, more dropped off, which was replaced. All went well until in turning to enter the barn nearly half the load upset, while the storm was almost overhead. The farmer's beloved wife came to offer assistance while he was in ill humor, and overheated, tugging at big forkfulls to get it in the barn, the wife anxious to help asked, "Can I do anything to help you?" to which the husband replied, "No, dear, you cannot, go in the house, I am going to express myself." So I am going to express myself in mild language and plain terms on the subject of agricultural geology, and history reviewed, with emphasis on *reviewed*, which I tried to confine to fifteen minutes, without exceeding the speed limit.

Spragging the Wheels

At the coal mines, to prevent the mine cars without brakes from running wild, use is made of tough, round clubs, pushed between the felloes to check the speed and stop the cars where wanted. The time is here when there is danger of the agricultural cars overloaded with mushroom agriculturists and theorists on a down grade, to throw some clubs on the track and in the wheels, to avoid the danger of going over a precipice or into the breakers, with the Juggernaut crushing the taxpayers under the wheels.

AGRICULTURAL GEOLOGY AND HISTORY REVIEWED

After spending much time and thought during many years reading theories and following the field workers and so-called scientists over much of this and other countries, striving to prove that the soil contains such vast stores of plant food elements that many generations can maintain themselves on the elements inherent in the soil. Virgin soils always contain more or less available plant food in proportion to its derivation, yet there is none inexhaustible although it may yield for considerable periods remunerative crops; it will eventually cease to produce paying crops. The alluvial lands—periodically overflowed—those derived from limestone and chalk with that from volcanic activities are most valuable, while the rocky, sandy, shaly or those consisting of very fine silt and tenacious clays are neither so lasting and more expensive to maintain.

The early settlers already knew the best soils, selecting such as were heavily timbered or along alluvial bottom lands where, with little effort, large crops could be cheaply produced for export such as cereals for milling as well as for distillation. Whenever land owners found the soil under cultivation less productive than it was originally, the heavily timbered hardwood forests were cleared and wastefully destroyed, or used up in building houses and barns with the choicest timber that would now be worth fortunes. The great barns and other buildings on the farms in the most productive sections testify the wealth taken from the land during the period when the farmers were capitalists loaning money, donating land for canals and railroads and investing in stocks and bonds which was often the last seen of their money, because of reorganization and receiverships.

It is also to be observed that in many parts of Pennsylvania, from the Delaware to the Potomac rivers, the valuable estates and fertile farms are now in the hands of absentee landlords, residing in towns and cities, engaged in some business that affords enough means to support the farms, display their wealth and their ignorance about agriculture, appealing to the State for the aid of rural uplifters, extension agents and specialists to help them make a big showing in the magazines and the press in general.

Under the system of finance, government and political rule, it seldom happens that actual farmers acquire means to purchase additional land, while those engaged in commerce, banking, law or in politics—provided the latter can stick to an office for terms of ten to twenty years, at salaries ranging from three to six thousand dollars, drawing on public funds to the extent of sixty to eighty thousand dollars—can invest in country estates and live retired as prominent agriculturists. Tenantry is on the increase; real farmers becoming tenants or driven into less productive sections where land is cheap to eke out an existence under adverse conditions.

Thus modern history is only repeating ancient history when the so-called nobility, or in plain terms the criminal cunning gained control of wealth created by labor, resulting in the decline of all the ancient governments being reduced to absolute poverty through exhausting the soil and the maintenance of an aristocracy, with immense military force to overawe their subjects. It is possible to postpone the inevitable with modern methods in the discovery of mineral fertilizers and earlier wastes, but it is questionable how long the supplies of moderate priced artificial fertilizers can be obtained to supply the quantity necessary to restore what is removed with crops. Chemistry may possibly come to relieve the future by combining the elements abundant in nature by preparing capsules of protein, carbohydrates and fats in condensed form to sustain future generations of inhabitants in countless numbers a century hence. The only salvation for farmers, as well as the general public, at this time is the use of commercial fertilizers and chemicals, regardless of what some would-be advisors, who sometimes ridicule its use may say. The honest fertilizer manufacturer who supplies the trade at reasonable prices, with honest goods deserves the respect of the people.

After spending many hours studying over the subject of agricultural geology, reading text-books and following the soil survey in its

ramifications over states and nation, my conviction is that the public fund expended is just so much money wasted for all it accomplishes. The advice is the same and may be stated in one short sentence: Use manure, lime, chemicals, cowpeas, soy beans, crimson clover, alfalfa, rye, etc., with green manure for humus, then irrigate or tile drain, as the conditions suggest.

It is doubtful whether any practical farmer who is established in a location, on such soil as may make up his farm, ever derived any benefit whatever from all the vast literature and maps published and the great amount of money spent in soil surveys and soil analysis. The mechanical condition of a soil is of greatest importance, when of a consistency to hold moisture and fertility the other elements can be supplied, while other soils may show a larger amount of mineral elements by chemical test when in an unavailable state are entirely useless in practice. It has been demonstrated in England and our State that chemical fertilizers can be relied upon to produce crops equal to that of manure, resolving itself into a question of economics. Where manure can be obtained for nothing or at low cost, it is advisable to take advantage of the opportunity. Not so much for its plant food value as for the humus or carbonaceous matter contained to ameliorate the soil and hold moisture when that is lacking.

As for the soil analyses which may show tons of the elements needed by plants, it is not safe to depend upon it. Crops are the best guide that every farmer has at his command; so that by simply observing and a little experimenting is of more value than all the fine spun theories advanced by so-called experts. At small expense a small quantity of hydrochloric acid of ammonia with red and blue litmus paper, any one can make soil tests that are at once instructive and enlightening.

Of all the activities imposed upon the tax payers as rural uplifters, experts, specialists, etc., the agricultural press throughout the country is of more value to practical agriculture than all other agencies combined. The reason is that they disseminate all the useful discoveries of science and contain the actual experience of thousands of close observers and practical knowledge from all parts of the country.

After deliberating and considering the situation, I have concluded that it is time to call a halt and cry out "hold, enough!" When stalwart farmers follow their shipments to market and shed tears because their strenuous labor in producing tomatoes, peas, beans, potatoes, peaches, etc., do not realize enough cash to pay trolley fare, finding themselves in debt for freight and commission having labor, taxes, with incidental operating expenses drives them to insanity and even suicide. At the same time more rural uplifters manifest their interest in agriculture, among whom are newspaper publishers who could not distinguish between alfalfa and clover, between a jack and a giraffe. Yet they presume to trade on the credulity of farmers, assuming an attitude of friendship for benighted ruralists.

Even highly perfumed town dudes wearing creased pants, looking through their bi-noculars have regard for the farmer; treating former mud-sills and cold hoppers with a show of respect, because they hope by passing a few years in some institution where agriculture is taught

to gain positions as county agents or professors of some sort and on the pay roll of a State. After passing through the corridors of some college from room to room listening to lectures, in a short time they emerge as from a cocoon, full-fledged agents of "agentesses" to be quartered on the community.

Real farmers are getting tired of being chastised, harangued, scolded, offered free advice and encouraged to rob the soil in order to produce more and cheaper butter, eggs and other products, costing more than they bring in the market. Having attained such a degree of efficiency with "greatest economy," it is not necessary to bear the burden of increasing taxation to maintain an army of self-constituted guardians of agriculture in this country. Therefore, they should be provided with picks and shovels, crowbars and overalls to demonstrate the power of the fulcrum in prying out rocks and the proper angle to use tools with the least waste of energy and the greatest efficiency on the roads. Our new dependencies, Alaska, Cuba, Porto Rico, the Philippines, need scientific advice where numbers might be assigned and some to China, India and Persia where the inhabitants frequently perish of starvation. Using the phrase "greatest efficiency and economy," may be considered as a joke in our laws, likely introduced by some humorous member of the Legislature from Philadelphia or Pittsburg to catch the unwary ruralists with a few meaningless words regarded as a "scrap of paper."

Farmers can get many things they don't want or ask for but reduced expenses, revision of our tax laws, the initiative, the referendum and recall are treated with contempt. There are throughout the country a class of persons manifesting uncommon interest in the farmers business, constantly prodding them on to raise larger crops when it is a well known fact that maximum crops are as a rule not remunerative. As an illustration: Take fifty bushels of wheat at one dollar per bushel, is worth more than a hundred bushels at fifty cents per bushel. Each sixty pounds of grain removes twenty cents worth of fertility at normal prices for fertilizers while the difference in value is more than made up in the extra cost of harvesting, threshing and marketing. At prevailing prices for fertilizers with potash at \$400 per ton, nitrate and phosphorus 40% higher, the fertility loss is vastly greater.

Since the passage of the Act there is money in view and more in prospect for extension work which creates rivalry between Boards of Agriculture and Departments and Experiment Stations, each striving to secure a share for good, round salaries to place rural uplifters in the field having more regard for the dollars than for the farmers' prosperity. It appears as if farmers were regarded as public servants not engaged in private business, and were expected to dig out of the soil the support of all others many of whom "do not labor, nor do they spin" but live as parasites upon agriculture enjoying the best the land affords, yet crying for more, more! The scheme to impose upon the country some two thousand uplifters (one in each county in the country) did not originate from farmers, but was promoted by a number of railroad officials, bankers, politicians, a few editors and manufacturers styling themselves "The National Fertility League," through their activities had the Smith Lever bill

passed. It is quite surprising to know how the farmers are esteemed these days and tickled like aphids are by ants to yield up sweet secretions to their tormentors.

Now that there is some show of prosperity in some lines of agriculture due to European conditions, it is worth while to watch Congress where the demand will be for appropriations and more appropriations for a variety of uses—good, bad and indifferent—only to increase the cost of extravagance and burden upon the honest industry.

REPORT OF THE COMMISSION ON COUNTRY LIFE

It is six years since the then President (the same who may be again President) reported after traversing many states and collecting information through circulars on the condition of agriculture and rural life.

Among the recommendations to improve conditions are the following: Schoolhouse meetings, the preservation of natural resources, preservation of forests and streams, etc.

They condemn the holding of land for speculative purposes, monopolistic control of water power, restraint of trade, and, in a general way, trusts, combinations and monopolies, also intemperance.

In this way they touched a vital spot on economical problems which was not appreciated by the beneficiaries of the so-called "men of affairs," so that instead of publishing the report in detail for general circulation as a public document it was confined to a limited issue for members of Congress.

The representatives in Congress and agents of "Divine Providence" evidently saw that it reflected upon special interests, promoters and speculators who did not care to see it published to the world that American farmers are exploited by combinations of capital, transportation, mining and manufacturing interests.

The commission received the same compensation that many of us receive only having their expenses paid.

With a view to get the report before the public and obtain a little compensation for their time the commission placed the report in the hands of a publishing house, and any profit derived from the publication accrues to the members of the commission.

Sturgis & Walton Company, N. Y., are the publishers.

MR. DORSETT: Brother Stout, it has been the custom from time immemorial to place flowers upon the casket and a sprig of evergreen on the grave of our departed friends; but we, the members of this State Board, your co-workers, deem it far better to place a few flowers along the pathway of the living and not wait until they are dead. In behalf of the members of this State Board and of your co-workers, I therefore deem it a source of pleasure to present you with this bouquet of flowers as a tribute to your years of usefulness in the interests of agriculture and in the general uplift of mankind. Your profound philosophy and deep sense of humor have been greatly enjoyed by your fellow-members and co-workers. Take this little gift as a token of our best wishes for many years of pleasure and prosperity, (presenting a basket of flowers). (Applause).

MR. STOUT: I am too much embarrassed and surprised, and without a dictionary or an encyclopaedia to collect sentences to ex-

press my gratification at this gift. I will call upon my excellent friend, neighbor and co-worker from Pottsville, Baird Halberstadt, to respond. (Applause).

MR. HALBERSTADT: Gentlemen of the State Board of Agriculture: Let me say, in behalf of the whole people of Schuylkill county, that we are proud of the man who has done more to advance the cause of agriculture in one county than any other five men in it. (Applause.) The man who has traveled early and late, always ready and willing to help anybody who wants advice in regard to farming or geology. To him we owe the agriculture, the formation and the keeping up of the Agricultural and Horticultural Society of Schuylkill county. It was uphill work for him, but today we have two hundred members among the farmers of our county. We are all proud of him; he is our Grand Old Man of Schuylkill county, and we all love him, and the more we know of him, the more we think of him. When people want to know things, although there are some jealous farmers over there, they go over to him, and some time ago, one of the farmers was asked whether they did as Mr. Stout did. He said, "No, we don't, we do just the opposite." But the fellow subsequently was discovered looking over Mr. Stout's fence one night to see what he had done the day before. They all wanted to know exactly what he was doing, and if they had followed his advice, they would have had the same success that he has had, for I want to say to you that he picked up an old, wornout farm and nearly starved to death getting that thing going; he couldn't help it, he had to take it, and today he has got one of the most productive farms in Schuylkill county.

In behalf of Mr. Stout and in behalf of the farmers of Schuylkill county, and in behalf of the Agricultural and Horticultural Society, of which I have the honor to be President, I thank you all sincerely for this mark of esteem and affection which you have shown the Grand Old Man of Schuylkill. (Applause).

The CHAIRMAN: The next report will be that of the Economic Geologist, Prof. Halberstadt, of Pottsville.

PROF. HALBERSTADT: I have brought with me a number of specimens and I will be glad to show them to any of the gentlemen who have enough interest in the subject to look over them. They are specimens showing the different minerals and the minerals for which the iron pyrites are sometimes mistaken.

Prof. Halberstadt then presented the following report:

REPORT OF THE ECONOMIC GEOLOGIST

By BAIRD HALBERSTADT, F. G. S.

During the eight years of my incumbency of the office of Consulting Specialist in the Department of Mineralogy and Geology, fully ninety per cent. (90%) of the specimens of minerals forwarded to me from various parts of the Commonwealth by farmers and others have been of the same species, varying only perhaps in form. In none of the

localities from which these came does this mineral appear to exist in deposits of value nor do large deposits of it of commercial importance seem to have been found in any part of Pennsylvania, certainly none have been in the past nor are any being exploited, on a commercial scale, at the present time. Notwithstanding this, there has been no mineral, perhaps, that has raised so many false hopes, and has been so often the foundation upon which so many "Castles-in-Spain" have been erected.

It has fallen to my official lot and always with a deep sense of regret, if not sorrow, to be obliged to shatter these "Castles" and to inform the prospectors or senders, that they have been building foundations with sand and that their long cherished hopes of great wealth, if based upon this mineral alone, will not be realized. Men, women and children indulge in fond hopes and one of these is the acquisition, sooner or later, of great financial wealth. If these indulgences bring pleasure only, no harm is done and it is even perhaps well that such hopes are entertained rather than gloomy forebodings. When, however, it is at the expense of time, money and labor, the disappointment that usually follows is keen, if not bitter. It must not be inferred that this mineral has no value but, on the contrary, it is a very important one. To be commercially valuable, the ore must occur in deposits of sufficient size and purity, at accessible localities, to make its exploitation or mining profitable. Comparatively speaking, the number of such developed deposits in the United States is relatively small, and these are usually found in the crystalline schists of the earliest geological formations.

To prevent further vain searches and the consequent losses of both money and happiness, it has been thought well to make this mineral the subject of my report for the current year, and to present it in such form, that even those who have little or no acquaintance with Mineralogy will no longer be deceived by it. An attempt, therefore, will be made to explain the origin, the occurrence, the uses and the value of this mineral and how to distinguish it from the more valuable minerals for which it is frequently mistaken, by the layman.

The mineral referred to is Iron Pyrites or Bisulphide of Iron (FeS_2). It is also known as mundic, a term applied to it by the miners, and as "Fools Gold." The name *pyrites*, a Greek word, means fire stone. The elder Pliny refers to it in his "Naturalis Historia," written over eighteen hundred (1,800) years ago; "There is much fire in it."

It was years ago used in place of flint on fire arms and on tinder boxes. From this, it is seen, that the mineral, under consideration has long since been known and it is quite probable that it has deceived, through all these centuries, countless thousands just as it is doing some people at the present time, and all because of its mischievous color resemblance to the precious metal gold, and its very wide dissemination or distribution in rocks of all kinds and of all geologic ages.

ORIGIN

The origin of and the mode of precipitation of iron pyrites are still, in some cases, questions of doubt. One theory is that iron pyrites result from the action of sulphuretted hydrogen upon salts of iron. Dr. Spurr has observed that: "In shale beds, there is

always a considerable percentage of iron. This usually combines with the sulphur contained in organic matter to form sulphide of iron (pyrite)." Some of it is probably of igneous origin.

OCCURRENCE

Iron pyrite is a very widely disseminated mineral. It occurs in rocks of all varieties and in all geological formations, from the earliest to latest, usually and unfortunately, however, in quantity or amount too small to make its separation a profitable undertaking. It may occur as bedded or vein deposits, or sporadically, as crystals in cubic form or some of its modifications; as nodules or lentils, in thin flakes or small particles throughout, slates, shales, schists, sandstones, etc. It is also found in coal beds, sometimes appearing as nodules; as partly separating the coal benches either as hard masses or intermixed with the mineral charcoal bands so often found in coal beds and known to the miners as "Mother of Coal." Again, it may be found in flakes as thin as the finest tissue paper adhering to the coal, along lines parallel to or at right angles to the planes of stratification in joints, where sometimes are found thin slabs, perhaps a foot or more in length covered with small cubic crystals, with a brilliance almost equal to that of cut diamonds. Its presence in coal is always detrimental and, in extreme cases, so much so that for either the manufacture of coke for metallurgical purposes, the use of such coal is precluded, because of the increase in sulphur content of the coal due to its presence.

The deposits of this mineral of economic value, now being exploited in the Eastern United States, seem to lie, geologically, in a belt of the Pre-Cambrian metamorphic rocks, extending, according to Prof. Reis, from New Hampshire to Alabama. The principal sources of domestic supply are in New York, Virginia, Missouri, California and Wisconsin. (In the latter state, the pyrite is separated from zinc blende by electrostatic methods;) while as a by-product in coal mining, Ohio, Indiana and Illinois produced 47,486 long tons in 1913. The production of pyrites in Pennsylvania has been very small and was limited to by-products of coal mining and not from distinct operations for the production of this mineral only.

GENERAL DESCRIPTION

Pyrite (Bisulphide of Iron) is a mineral of brassy yellow color; it is often found in the form of a cube, sometimes as an octahedron (8 sided) and as a five edged twelve sided crystal known as the pyritohedron or other forms of the isometric system. Again, it may occur in crystalline masses which may assume any form; sometimes it appears in the form of a bunch of grapes or botryoidal; again, it may be globular or in stalactitic form. It is extremely hard and brittle. In the scale of hardness, it ranges from 6 to 6.5, that is to say, it is harder than orthoclase (feldspar) and not quite as hard as quartz. The streak it leaves, after being rubbed on an unglazed porcelain or other white surface, is greenish to brownish black. It is opaque or impervious to rays of light, no matter how thin the piece may be. Its specific gravity is 4.9 to 5.2, being less than one-third as heavy as gold (19.26) and about one-half as heavy as silver (10.5). If the faces or sides be carefully examined it will be noticed

that these are striated, that is fine grooves or scratches will be found. These, it will be further noticed are at right angles to each other on adjoining faces or sides of the cube.

COMPOSITION

Iron Pyrites or Bisulphide of Iron is a combination of sulphur and iron; when pure, the sulphur percentage is 53.4%, while that of the iron is 46.6%. It frequently contains copper, arsenic, nickel, cobalt, gold or other minerals but in very small quantities.

USES

The principal use to which Pyrite is put is for the manufacture of sulphuric acid. Formerly, sulphate of iron or copperas was made from it but, as this is now obtained as a by-product of a process of galvanizing iron, the former method of producing it from pyrite has been superseded. (A few years ago, more than half of the sulphuric acid consumed in the United States was in the manufacture of superphosphates). Although this mineral is rich in iron, it is not used as an ore in the furnace, because of the excessive amount of sulphur it contains. Much of this injurious constituent can be eliminated by roasting the pyrite before using. The residue, "Blue Billy," is not, at the present time, considered a desirable ore for the manufacture of iron. The pyrite from some localities has, however, been successfully treated and is being used for the purpose. The "Blue Billy," after being treated to remove as much of the contained sulphuric acid as possible, is used to some extent in the manufacture of paint. It is not improbable, that before long, if not already, a successful process or method of treating the "Blue Billy" to remove its detrimental constituents will be found and its use in the manufacture of iron will be practicable and of economic importance.

HOW TO DISTINGUISH IT

The minerals for which iron pyrites may be mistaken are gold and copper (the latter in the form of chalcopyrite) and pyrrhotite. It will be found first, that the pyrite is harder than gold, as the former can not, except with great difficulty, be scratched with a knife blade; the pyrite is brittle, while the gold is soft and can be readily cut with a knife or hammered out into thin sheets. It differs from it both in color and the color of its streak. Chalcopyrite which is a sulphide of copper and iron can generally be distinguished from the pyrite by its greater softness (3.5) and with the naked eye, by its darker brassy color and its often iridescent tarnish, and the difference in its crystal forms. It is somewhat lighter in weight (specific gravity 4.25). Chalcopyrite crystallizes in the tetragonal system but is more frequently found as an ore mineral in irregular grains and masses. The color of its streak is greenish black.

Pyrrhotite or magnetic pyrites, another sulphide of iron, is sometimes mistaken for iron pyrites. It can readily be distinguished from it, because: (1) it is much softer; (2) its color is of a bronze rather than brassy yellow; (3) if it be broken into small pieces or powdered, it will adhere to a magnet. Its streak is grayish black, but, like the pyrite, it is brittle. Pyrrhotite may in turn be mistaken

for bornite and niccolite, as some specimens of these resemble pyrrhotite. A test with the magnet will quickly settle the question of its identity.

Marcasite has the same chemical composition but differs from pyrite in appearance and form of crystals. Its color, when freshly fractured, is lighter or paler. Its streak is black. It decomposes more readily when exposed to atmospheric influences. Both the pyrite and marcasite are used for the same purposes.

PRODUCTION

The production of iron pyrite in the United States, its value, and the price per long ton for three years is exhibited in the following table:

MINERAL RESOURCES OF THE UNITED STATES

Marketed Production of Pyrite in the U. S., 1912-1914, by States, in Long Tons.

State.	1912.		Average price per ton.	1913.	
	Quantity.	Value.		Quantity.	Value.
California,	61,812	\$201,453	\$3 26	70,586	\$218,525
Georgia,	27,008	62,990	2 33	11,110	55 04
Illinois,	1,462	5,684	3 89	11,246	31,966
Indiana,	14,487	43,833	3 03	1,242	3,115
Ohio,	162,473	621,219	3 82	13,622	34,993
Virginia,	17,896	70,518	3 94	148,259	587,041
Wisconsin,	66,753	228,552	4 99	5,328	94,727
Other States,†				59,995	290,618
Total,	350,928	\$1,334,259	\$3 80	341,338	\$1,286,084

State.	Average price per ton.	1913.		1914.	Average price per ton.
		Quantity.	Value.		
California,	\$3 10	71,272	\$235,129		\$3 20
Georgia,	4 90				
Illinois,	2 84	22,538	59,079		2 82
Indiana,	3 51	1,710	5,281		3 03
Ohio,	2 57	7,279	19,718		2 71
Virginia,	3 96	141,276	556,091		3 94
Wisconsin,	3 74	14,188	78,460		3 53
Other States,†	4 34	78,399	329,588		4 20
Total,	\$3 77	336,662	\$1,283,346		\$3 81

*Included in "Other States."

†1912: Georgia, Missouri, New York and Pennsylvania; 1913: Missouri and New York; 1914: Georgia, Missouri and New York.

The marketed production of pyrite in the United States since 1882 is given in the following table:

Marketed Production of Pyrite in the U. S., 1882-1914, in Long Tons.

Year.	Quantity	Value	Year.	Quantity	Value
1882,	12,000	\$72,000	1899,	174,784	543,249
1883,	26,000	137,500	1900,	204,615	749,991
1884,	85,000	175,000	1901,	241,801	1,257,873
1885,	49,000	220,500	1902,	207,874	947,089
1886,	55,000	220,000	1903,	223,127	1,109,818
1887,	52,000	210,000	1904,	207,081	814,808
1888,	54,331	167,658	1905,	258,000	938,492
1889,	93,705	202,119	1906,	261,442	931,305
1890,	99,854	273,745	1907,	247,387	794,949
1891,	106,636	338,880	1908,	222,698	867,113
1892,	109,788	305,191	1909,	247,070	1,023,157
1893,	75,777	256,552	1910,	241,612	977,978
1894,	106,940	363,134	1911,	301,458	1,164,871
1895,	99,649	322,845	1912,	350,921	1,334,253
1896,	115,483	320,163	1913,	341,328	1,286,074
1897,	143,201	391,541	1914,	336,663	1,223,346
1898,	193,364	598,801			

*Includes production of natural sulphur.

The figures for 1915 are not at command but the enormously increased demand for sulphuric acid by the makers of high explosives has probably vastly increased the output of the United States and increased its cost.

The CHAIRMAN: Gentlemen, you have heard the report; will you discuss it? If not, it will be received and included in our proceedings, and we will proceed with the next report, which is a report on Livestock, by Mr. W. F. Throop, of Espyville.

MR. THROOP: Mr. President and Members of the State Board of Agriculture: As a new member of your body, this is my first appearance before you. After listening to the papers you have heard this morning, I feel that I am surely out of place to get up and try to interest you or give you anything that will be of value to you after these reports, but I want to say to you that I do feel proud to be a member of such an honorable body of people, composed of such grand and noble men as Brother Stout. I am going to detain you but a very few minutes.

Mr. Throop then presented the following report:

REPORT OF COMMITTEE ON LIVESTOCK

By MR. W. F. THROOP, *Chairman.*

My chief interest lies in agriculture. That is why I am dairyman. The future of agriculture, which means the future of the people, is to a great extent bound up in dairying. Agricultural pre-eminence can best be conceived through the best development of stock husbandry. Any business gains in its returns, in its interests, in its

attractiveness, just in proportion to its complexity; just in proportion to the natural effort it takes to handle it. When you introduce into the business of stock-raising the element of superior intelligence of plan, of purpose and long continued and persistent effort, just the minute that you put that business, or any other business before people who have money, just as long as it takes a mind to run a business it will attract other minds to it, and its future is assured.

We are just now in an era when the greatest intellectual pursuit of this country is agriculture. It takes more money, more plans, more courage more inspiration than any other kind of a farmer to be a dairyman. This is no reflection whatever on the grain farmer or any other farmer, because of the fact that we need the grain farmer to produce the grain that we cannot produce ourselves.

In discussing the question of livestock in Pennsylvania, I am at a loss where to begin, because we cannot rank as a real stock-raising state, although we do raise some and should raise lots more. But it is the condition of livestock in the State, the way we care for it in order to make it most profitable to the farming interest. When I say we are not a stock-raising state, I should go farther and say that the interests of the state are so many and varied. We probably have one of the best markets of the United States right in Pennsylvania, but we have allowed those markets to be largely supplied from the outside, more particularly the animal foods.

Pennsylvania is not considered a horse-raising state, although we do raise some, and good ones too. There is money in raising sheep, and certain sections of Pennsylvania are adapted to this industry. The dog nuisance is a serious obstacle, but that can be remedied or controlled by placing a higher value on the sheep than on the dog.

The horse industry in this State is a very important industry. By using pure bred sires, Pennsylvania may improve her horses. The tractor has not yet crowded the horse and his usefulness from the average farm as yet.

The theory of preparedness will apply to the breeding, raising and marketing of beef cattle. From reports of breeders of beef cattle in Crawford county the farmers throughout the state are finding ready sale for pure bred sires of a good strain within the last three months much better than within the last five years. The choice of breed is a matter of individual liking. There is no battle of breeds. The average citizen takes too little interest in the bulletins issued by the State and Federal Bureaus of Animal Industry, but the one prepared by the Committee of Statistics and Standards of the Chamber of Commerce of the United States should be interesting to every meat-eater. It says the future supply must come from the South. That section can produce more cheaply than any other section on account of its cheap lands. The pasture season is longer, grazing good, and feed can be produced at a minimum price, and shelter during the short winter is inexpensive.

In Pennsylvania there are thousands of acres of mountain land that is too rough for farming which could be used for grazing purposes to a very good advantage. Through the northern part of the State Canada blue grass can be raised, and the southern part of Kentucky blue grass, and there is no better pasture than these two grasses for producing a fine quality of meat.

In one of the daily papers of a recent issue, I found this article on livestock values in Pennsylvania. The article states that agricultural conditions are excellent and prospects of a big year for the farmer are bright. These are revised figures from a statistical report of the State Department of Agriculture: Milk cows and other cattle are rated as being 101% of the average, while horses, mules, sheep and hogs are up to the average for this State. The following divisions are made:

	Average Value.
Horses,	\$121.00
Mules,	128.00
Milk cows,	55.50
Other cattle,	29.00
Sheep,	5.40
Hogs,	11.80

May the livestock breeders of the State of Pennsylvania look ahead to a broader future, by putting forth greater efforts, being prepared to feed the increased population, securing for ourselves health, wealth and prosperity.

The CHAIRMAN: Gentlemen, you have heard the report; will you discuss the report? If not, it will be entered in the proceedings of this meeting. The next is the report on Poultry, by W. Theo. Wittman, of Allentown.

Mr. Wittman presented the following report:

REPORT OF THE COMMITTEE ON POULTRY

By W. THEO. WITTMAN, *Chairman.*

As Chairman of your Committee on Poultry, I would respectfully report that several interesting conditions have existed in this industry during the last year. That the consumption of eggs is still on the increase and that the quality of the eggs consumed, due to our Pure Food laws, is steadily improving, is without doubt. That the next logical step, after making sure that all eggs marketed shall be fresh or fairly fresh, is to see that all eggs are clean and are produced under sanitary conditions—a fresh or comparatively fresh egg is no guarantee that said egg is always desirable from a food standpoint.

That the amount of poultry consumed has increased or will increase is doubtful, for poultry meat consumption being one of the higher priced meats will decrease, with the general decrease of meat consumption, that seems inevitable. Neither does there seem to be any improvement in the quality of the poultry marketed and just as long as poultry generally is regarded as a luxury, chicken and turkey on the table will be regarded as “chicken” and as “turkey” regardless of its quality on the market. If growers could make growing specialty market poultry profitable or if that big class of producers, viz: farmers, would generally adopt caponizing, there would be a prompt and marked improvement in market or killing poultry.

The apparent decline in the interest shown in fancy or show poultry and in poultry shows or exhibitions mentioned in last year's report still continues. However, with the advent of good times, the demand for this kind of poultry and the prices for same have shown some improvement, although still way below those prevailing only a few years back.

Likewise, the enormous interest in utility or work-a-day poultry mentioned as having taken to a large extent the place once occupied by fancy poultry, continues unabated. This interest centered to a great extent on White Leghorns, and especially English White Leghorns, on Wyandottes, Rocks, Reds and anything that could make a record at laying eggs. Probably, of all these, the English White Leghorn and its crosses with native or American bred Leghorns, thanks to the liberal way Pennsylvania poultry people imported, predominate as an egg farm proposition. A striking example of the good of all this is the hen Lady Eglantine, winner of the late North American egg laying competitions and of the world's record, with a total of 314 eggs laid in one year and owned by Mr. A. A. Christian, a Philadelphia man, but with his farm at Greensboro, Md. This now world famous hen is not only part of this English blood but is a living monument to the science of breeding and should for all time put the quietus on the foolish claims of some that production, or, the ability to lay heavily can not be bred into hens. It is entirely correct to say the Lady Eglantine was deliberately made by her owner—made for the purpose of laying eggs.

Just what sort of laying 314 eggs in one year is, can best be comprehended by comparing the average number of eggs laid by the hens on the farms of this State as gathered by the census enumerators for the census of 1910, viz; 68 eggs, 314 eggs and 68 eggs! It would seem there is still a great deal of missionary work to be done among our farmers if their hens are to lay anything approaching a maximum yield—your Chairman would urge that the individual members of this State Board of Agriculture would do their mite of this sort of work by the good example of tolerating nothing but pure-bred poultry on their home farms.

The wet summer of this past year found at its end probably the best grown lot of chickens seen for many a year. This was true on farms, on egg farms and large poultry plants or wherever growing chickens were enjoying free range. Chickens matured early, grew big frames and broad lustrous feathers, either directly due to the wet season or indirectly to the abundance of succulent growing things and insect life.

Highest returns this year to any of our egg farmers was 63 cents per dozen with a break in price the earliest yet known. Fall eggs, not winter eggs, now reach maximum prices, probably because, first, more chickens are hatched early; second, more storage eggs come out early.

Your Chairman within the last year made a return trip to the Pacific coast and diligently employed the opportunity to study poultry possibilities and prospects not only there but enroute over two widely divergent routes and is more fully convinced than ever that Pennsylvania offers as many opportunities to make good with poultry as any other state or section.

The CHAIRMAN: Is there any discussion of this report? If not, it will be received and entered in the proceedings. The next is the report on Forests and Forestry, by Mr. Irvin C. Williams, of Harrisburg.

MR. GEORGE H. WIRT: Mr. Williams, unfortunately, was called out of the city on other business and asked me to read his report. I might say that, as you have undoubtedly studied the agricultural conditions in this State, you know full well that according to statistics at least, of course, you know that some statistics do tell the truth and some do not, but at any rate, statistics show that the actual acreage of land in Pennsylvania under cultivation is gradually decreasing. A certain amount of this, perhaps, is taken up by building sites, quarries and uses of that kind, but it is a tremendous indictment against the State of Pennsylvania that something over four million acres of so-called agricultural land is now in an unproductive state. The farmers of this State are paying taxes upon that land and getting nothing from it. It is not fair to say that it is non-agricultural land; much of it could be cultivated, much of it could be made to produce agricultural crops. The fact of the matter is that it is not now producing agricultural crops and probably will not be needed for that purpose for years to come. The only sensible thing to do with such land is to reforest it, and the State of Pennsylvania, the Department of Forestry is growing seedlings and is now permitted to distribute them to farmers free of charge, except for the matter of transportation from the nursery to the farmer's station, and we are more than glad to be able to supply our farmers with seedlings and give them assistance and advice in the matter of planting their waste lands so as to make them productive and so as to reclothe these four million acres of land which is taxed to them, to make that land productive.

Mr. Wirt then submitted the following report:

REPORT ON FORESTS AND FORESTRY

By IRVIN C. WILLIAMS

The record of the legislation in 1915 for forestry in Pennsylvania is a satisfactory one, evidenced by the passage and approval of 8 different acts of assembly.

Under the new laws, land suitable for forestry purposes held in ownership by the counties must be offered for sale to the Department if required. The price to be paid is the amount of taxes due, plus interest and costs.

For a number of years forest trees seedlings were sold by the Department at cost of growing. Many thousands of young trees were distributed over the State by these means and paid for by citizens interested in tree planting. The new act permits the Department of Forestry to distribute excess trees, in stock, for the asking, under reasonable provisions relating to planting, growing, and subsequent

sale. This puts the distribution of trees in line with the distribution of fish and game, which has long been done in a similar way at the expense of the State.

In an attempt to procure a more efficient execution of the laws relating to game, fish, and forestry, a new act of Assembly requires all the employes of these three departments to protect the interests and assist in executing the laws of others.

When the Department of Forestry was established in 1901, a limit of \$5.00 per acre was set for the purchase of lands. This was a safeguard which we believe was properly inserted in the law at the time. The problem of buying lands for State forestation then was a new one and such a check relieved the Department of an untold probable amount of pressure which otherwise probably would have been brought upon it to purchase lands at high price. At the last session of the Legislature the limit of price was increased from \$5.00 to \$10.00 per acre. This will enable the Department to purchase a number of small interior holdings actually worth more than \$5.00 per acre, and thus enable a better consolidation of the State Forests. This is valuable from the viewpoint of protection as well as from desirability of solidified land ownership.

The experiment of the Department entering into co-operative relations with the act of 1913, has been a success. The Department is now actively co-operating with the Pocono Fire Protective Association and with the Central Forest Protective Association, each of which organizations are interested in large areas requiring better protection and ultimate forestation. An amendment to the law of 1913 enlarges the powers of both the Department and the local organization and gives them a better working program.

In order that local development may not be hindered by the presence of large bodies of State land acting as a barrier to a greater or less degree, the recent Legislature enlarged the powers of the Department with respect to granting rights of way. It ought not to be the policy of the State Government to set up any obstruction in the path of private local improvement, especially when such improvement is dependent upon a right of passage through lands which otherwise would be closed to entrance.

The school code of Pennsylvania provides for a State School Fund, to which moneys shall be added from time to time as they are derived from various sources. Originally it was provided that 80% of the net proceeds of the State Forests should be added to this fund. The difficulty of calculating net proceeds when the fifty or more State Forests are taken into consideration, as well as the reduction from 100% to 80% of these proceeds as an addition to the State School Fund, would have continued to operate against the increase of that fund. The Department of Forestry has always felt that the State School Fund might well receive the entire proceeds derived from State Forests, and in a few years these proceeds must, in the nature of things, become large, thus accelerating this most valuable fund to a larger and better degree. By an amendment passed to appropriate sections of the school code, all proceeds from the State Forests are paid immediately into that fund. The revenues of the Department from its inception to date are in the neighborhood of \$125,000. By an act of appropriation, \$80,000 of this amount was

specifically appropriated and applied to the State School Fund. With further forest development and the marketing of forest products, the proceeds will increase from month to month. Those paid into the Treasury during the month of December last past and immediately credited to the State School Fund, amounted to \$2,090.03.

By all odds the most valuable piece of legislation procured at the last session was the forest protection code, which completely revises the system of forest fire wardens, establishes a bureau in the department to take care of forest protection exclusively, places at the head of the bureau a person competent to do this work, who devotes his time exclusively to protection, and who has since been actively engaged in the revision of the whole system.

Forest fires are still prevalent in Pennsylvania. The average size and average damage wrought by fire is gradually being decreased. With a better fire fighting system and with a greater awakening to the necessity of preventing and extinguishing fire, Pennsylvania will surely soon be able to take her position among other forested states who have larger appropriations for fire protection and are reducing the fire problem to a very small matter. The density of Pennsylvania's population, the diversity of her industries, and the unparalleled opportunity for permitting fires to burn, coupled with a certain viciousness of disposition which is still found in individuals as well as in groups of men, along with the difficulty in the majority of cases and at times the utter impossibility of procuring evidence sufficient to secure a conviction of offenders, when considered in connection with the aggregate areas burned and the resulting loss from fires, is a source of satisfaction at least, although the Department will never rest satisfied with its efforts until it is in a position to maintain complete and efficient control. The Department of Forestry is dependent entirely upon legislative appropriation for means to do this work, and we can only say, as has been said on numberless previous occasions, that this problem is one resting wholly upon the Legislature. Without means the Department can do nothing. With adequate means it can equal, and we believe exceed, many of the other states. A forest fire appropriation of \$45,000 allowed for two years in 1915, is utterly inadequate to meet our needs and conditions. The records of the Department show that during 1915 there were 1,104 forest fires reported upon by the forest fire wardens.

The record of accomplishment for the Department of Forestry to date stands as follows:

It has purchased and paid for out of legislative appropriations, 1,008,140 acres of land, costing an average price of about \$2.28 per acre.

It has educated foresters to care for this land, now divided into 54 forests, each of which is in the care and administration of a technically trained State Forester.

Forest administration is dependent upon roads, trails, fire lanes, telephone lines, observation towers, a protective force of forest rangers, and an interested group of people in its neighborhood who are willing to lend a hand at a moment's notice to prevent destruction by fire. The foresters and their assistants to date have built over 3,500 miles of travelable roads, trails, and fire lanes. Upwards of 250 miles of telephone lines are constructed. These connect

rangers' homes with forest headquarters, and these again with the general telephone system of the State. Foresters are doing improvement work and taking out undesirable material and selling it for the best price to be obtained. The revenue of the Department is largely derived from this class of sales.

The foresters and their assistants have planted upwards of 18,000,000 seedling trees of good species, and have covered more than 8,500 acres, otherwise denuded, unprofitable land.

The State Forests have been thrown open to become the camping ground and recreation places of the citizens of the State. What are known as permanent camp sites, under formal lease for a period of ten years or less, may be had for a trifling annual sum. Temporary camp sites are permitted without charge. In the case of the former, there is exclusive use by the lessee of his camp site, with the privilege of building upon it such a structure as meets the approval of the Department.

The whole force of the Department is interested in carrying the knowledge of its work to the people. Educational efforts are under way in all parts of the State. Foresters and rangers take an interest in the school children and afford them facilities for enjoying the State Forests. The newly formed Bureau of Education within the Department will collect statistics and information, and through the newspapers, principally those in the counties and rural neighborhoods, will keep the people informed of the weekly progress of events.

The Department of Forestry regards itself as the servant of the people. It is ready at all times to afford such assistance with respect to the scope of its business. It is particularly desirous of awakening a greater and better sustained interest in farm woodlots. The owner of any farm having upon it a woodlot which is in need of improvement or other treatment, may, for the asking, have the advice and direction of the Department in its handling. While our facilities at present may be limited by lack of means and lack of men, the desire to help is constantly with us.

The Department has recently undertaken topographical surveys of its forests and a complete delimitation of its boundaries. The latter has been going on for a number of years and boundary surveys are in their incipency but to date four forests have been satisfactorily covered. With topographical work goes the taking of an inventory or the making of a stock survey, so that it will soon be possible to know what amount of material is contained within each forest, its character and its value.

The Pennsylvania forests are not set aside as reserve areas and locked up. The people of Pennsylvania are not denied participation in the general use of the woods; but to the contrary, as above stated they are specifically invited to use these woods under a few reasonable regulations necessary for their proper protection.

The establishment of the State Forests and their proper development will result in two things of great value in the future to Pennsylvania: First, a new wood supply, and secondly, the protection and development of our water resources. The question of a pure and adequate water supply is already confronting us in a very noticeable way. The continued settlement of the State, the increase of popu-

lation density, the establishment of new industrial plants will cause this problem in the near future to be one of still greater importance. The Department is now authorized to grant to municipalities the right to receive water supply from State lands, when so situated that it may be economically derived.

The Forest Academy is still educating young men for the forest service. For proper administration, Pennsylvania foresters are at present too few. With intensive administration the forest areas in charge of each forester must be reduced. This requires more foresters, and they are specifically educated for this purpose at the State Forest Academy.

Because of her ribbed and mountainous character, Pennsylvania has a large area of land suitable for no other purpose than the growing of trees. At least 8,000,000 acres of land of this character can scarcely ever be made to produce anything else of importance. A larger proportion of this area should be put under State Forests than at present. Therefore, purchases of land for forest purposes by the State should be continued through a liberal and well sustained policy. Forest land in State ownership is better protected and better developed than ordinary wild mountain land in the hands of the private owner. Lack of capital and of disposition permits private land to lie wild and devastated. No Pennsylvania acre should lie waste, but ought to be made to produce its full quota of return for the benefit of the whole State. Now forest planting must be continued in areas where trees cannot grow because of destructive lumbering, forest fires, and the removal of all seed trees. Our plantings should be largely increased and well they might be, were the means at hand to do the work. This Department may and ought to become one of the most useful adjuncts of the State Government; but there is no possibility of its becoming so unless it is better sustained and permitted to enjoy a wider and more comprehensive development by intelligent legislative action.

The CHAIRMAN: Gentlemen, you have heard the report; is there any discussion?

MR. KIEFER: Are farmers who are not members of this Association permitted to discuss these papers? This is my first appearance in the Association. I have been a farmer for some years and feel strongly on that paper and would like to discuss it.

MR. HUTCHISON: I move that the gentleman be accorded the privilege of the floor.

(The motion was seconded and adopted).

MR KIEFER: I am Mr. Horace Kiefer. I want to introduce myself as being the son of a very old friend of the gentleman from Schuylkill county. I was born in Schuylkill Haven. I feel very strongly, ladies and gentlemen, on this forest fire business. For six years in the counties of Cumberland and Adams, I had charge of 40,000 acres of timber land for Julian Porter and old Tom Scott and others of this State. We had, up to the time I went there, forest fires that destroyed from two to five thousand acres of timber a year, and as high as three to five thousand cords of

wood. 'I was responsible; I was sent there for that purpose, and to run their iron mines, manufacture their charcoal iron, and operate a railroad of thirty miles. I found it was organization that was necessary to prevent those fires, and I went about the organization, and after that, the four years I was there my total loss was 200 cords of wood, with proportionately small areas of forest fire.

Several years ago, I was in the State of North Dakota, when the great fires of the Pacific Coast, lasting from three to six weeks out there, darkened the sky for two weeks in the eastern and central parts of North Dakota, so that you could not see the sun for that length of time. Railroads were disorganized. The Great Northern, the Northern Pacific and the Canadian Pacific could not run a train for nearly a month through part of that district. They gathered up all the track hands they could get, they did everything possible to check that fire, and hundreds of lives were lost by men who got into that terrible maelstrom and could not get out. After the whole thing was over, I sat down and studied the matter out. I got statistics which I procured from the Nation and read up on them thoroughly, and with my own experience I felt that all this destruction from forest fires could be prevented by one thing, and that was organization, the same organization I had at Pinegrove Furnace over here in Cumberland county. I prepared a statement and put it in the hands of every Governor of a State as well as your Governor in Pennsylvania, and I asked for practically the same organization that was in existence with regard to the life saving stations of the National Government. There we have along the Atlantic Coast dozens of stations for the saving of life in times of storm. We have the same sort of stations up on the Lakes. When the Lake people get into terrible trouble and have big storms, there are instances of record where special trains have been sent from the Atlantic Ocean to the Lakes and vice versa, to help out those stations and to save property and life.

Those fires on the Pacific slope, on the Cascades and Rocky Mountains, were not stopped until the United States sent soldiers in there, an organized body of men. We have today in the United States and in every State, especially in Pennsylvania, a large body of state militia that could be used for that purpose when we have large forest fires, and we have had them every year and they do not seem to me to be on the decrease any. Why shouldn't the State employ its State militia to go and fight those forest fires systematically on a special train, and put hundreds of men, or thousands, if necessary, into service and put those fires out systematically and in order at once? Why should not the United States army—and I am the son of an army officer, every member of my family is in the United States army—why should not the United States Army be employed in putting out forest fires instead of camping around on parade grounds, doing nothing from one year's end to another, and drawing large salaries—the officers? Why should not they be trained in the system of fighting forest fires? I could go into the method, showing how it is done, but it is not necessary here; I simply want to impress on this body the idea of trying to get some legislative action along the line to employ our State militia and national soldiers in the method of fighting forest fires, the same as the life saving people protect property and life along the coast.

I want to get back now to this dog question, on the paper that the gentleman read here a while ago on sheep raising. I have four or five hundred acres of land not far from here, and I bought a good bit of timber land, bought some recently, with the view of raising some cattle and sheep. The dogs have practically destroyed every sheep and every lamb within a radius of twenty miles of Harrisburg. It is not altogether the farmer's dog, but it is the city man that keeps a dog for the purpose of hunting, probably thirty or sixty days in the year, that will turn him out, or they get out along the mountain and start from the Susquehanna River over to my old neighbor's place at Pinegrove and clean up everything. I have known within one night, within a distance of ten miles, twenty-five ducks, three head of calves and fifteen sheep killed. That is why the people are crying about the high price of living and paying twenty-five cents a pound for mutton chops, and they deserve to pay it. We cannot raise sheep here in Pennsylvania. Even if we fence our mountain land up, it does not protect the sheep, it does not protect the calves. The dogs get through the fences, get over them, and they become so wise and educated in their methods that it requires a man to set up all night with them, as well as all day, and I think we ought to ask this Association here to adopt some sort of a resolution to impress the people of the State of Pennsylvania thoroughly about this dog business. I thank you all very much.

MR. KERRICK: I would like to ask the gentleman who read this paper, if I understood him correctly, the majority of the fires are caused by farmers?

MR. WIRT: I made no such statement and would not like to especially in an organization of this kind. (Laughter.) In answer to your question, definitely, the causes as returned by our forest fire wardens, run something like this: Out of the 1,104 fires that we have reported, there were 383 that the fire wardens reported as not knowing any cause. The chances are that the majority of those were caused by smokers, people who travel back and forth through the woods. Some perhaps have been set by saw-mills; some of those perhaps by railroad engines. As a matter of fact, in that unknown bunch you may say that all sorts of causes were classified. The fact of the matter is that the fire warden was not on his job soon enough to find out just what did cause the fire. That is where part of this system comes in. There were 272 fires definitely reported as having been caused by railroads.

Now I know I have appeared before this Association for the last four or five years, and nearly always have it thrown at me that the railroad causes most of the fires. The fact is that the railroads do not cause most of the fires; they cause about 25% of the fires reported each year. Brush burn, which is I suppose in 99% of the cases done by farmers, was reported as the cause of 159 fires, if I remember rightly. Hunters and fishermen, 105; lumbermen, that is, from their saw mills or saw mill engines—I mean the tram roads—I think 78, something like that; but totalling the brush burn, the lumbermen and the ones reported as hunters and fishermen, we have 263, almost as many as are definitely reported as coming from the railroads.

Now I contend, and I believe absolutely, that the majority of the fires which we have in Pennsylvania are due to three things. You may assign certain other more definite causes perhaps, but these three things are the causes of forest fires in Pennsylvania: In the first place, ignorance—now I do not mean that an educated man, a highly educated man, will not set a forest fire; I do not mean that kind of ignorance; I mean ignorance as to the necessity for carefulness with fire in the woods and ignorance as to the results of what those fires may bring about. In the second place, carelessness. Ignorance, of course, breeds carelessness, but a great many farmers, if you please, and a great many hunters and fishermen and a great many of all classes of our people go into the woods, automobilists, tourists of all kinds, go through the woods either in their cars or on foot, and very carelessly drop their matches, cigarette stubs, cigar stubs, pipe ashes, leave their camp fires without extinguishing them, etc., with the result that forest fires arise; and the third cause is indifference. In its civilized state, such as Pennsylvania is, what excuse have we for allowing a forest fire to burn for one week before anybody gets after it? Why, it is a shame. And yet I want to put it right up to you farmers that some of you, perhaps not anyone here, but some of the farmers in the State of Pennsylvania, I know, would sit and watch a forest fire for a month before they would go and help to put it out, and they will say so, and when our officers go and ask them to help, the language they get is not very pleasant to listen to, and yet the farmer does not realize that the burning of a hillside back of his farm may mean a very large reduction of his crops the next year.

I have estimated on a minimum figure that, from the returns which we have turned in every year, the State of Pennsylvania is suffering a loss of anywhere from \$20,000,000 to \$50,000,000 a year simply because of the fact that a certain acreage is kept non-productive that should be growing timber, and as a result of the loss of the timber which might be growing and the labor which might be expended upon it, the State suffers to the extent of between \$20,000,000 and \$50,000,000. The annual direct loss, as returned by our fire wardens, which I think is a low figure, is over \$1,000,000, and what the indirect loss is to farmers' crops all over the State, to industries and people generally as a result of floods and all of the unsatisfactory indirect effects of forest fires, no man in God's world can ever estimate it, but it is more than \$50,000,000. I tell you the people of the State want to wake up to this tremendous problem, and the farmers or the fellows who are back along the hillsides are the men who should realize these things and should help to see that the people who owned the woods, the people who used the woods, should be careful and that when fires occur, that they should be immediately extinguished and not left to go until they reach a certain size or a certain area before anybody pays any attention to them.

I want to say right now, as the head of this new Forest Fire Protection Bureau, if any of you happen to run across any of our fire wardens who are not on the job, I want you to tell us about it. The gentleman was right when he said that the solution of this problem was organization; that is a very large factor, but I want to tell the gentleman that, with the best of organization, unless we have the

co-operation of every well-thinking man and woman in the State of Pennsylvania our organization would not count for much. We have got to have the support of everybody. I know we have that land down there now that the gentleman had charge of, and we have an organization just as complete as his was and we have the land from there clear down to the Maryland line under a careful, systematic organization for forest protection, and yet the fact of the matter is that this spring something like 5,000 acres burned over. Why?

A Member: And last year too.

MR. WIRT: Because of the fact that, with all of the organization, one man did not co-operate. One man did not co-operate and he broke the whole organization. State militia and the whole United States army would not have stopped that fire under those conditions that existed at that time. The wind blew the fire from one hillside clear across the valley to the other. The fault of the matter was that the thing was stopped when it was small; that is where our organization and when our co-operation has to come in. A certain amount of fires are going to burn, a certain amount of fires are bound to arise along railroads, specially; they have a certain operation which they must perform; a certain number of railroad fires can and will be stopped, are going to be stopped; a certain amount of fires are going to escape from brush piles, they cannot help it, with the very best of care sometimes, if a man is foolish enough to set a brush pile on fire on a windy day, the fire is going to get away; but the thing to do is not to go home and say we will let it go until it gets on the other side of the mountain, then we will fight it; the thing to do is to get to work at once and you will only need five or six men in the immediate locality in which the fire is going to burn, but by the time we could get a company of State militia in there, the local men will have the fire out. The farmers are responsible for a number of fires, I would not say they are responsible for a large number or for the greatest number.

MR. KERRICK: Whose duty is it to observe that the railroads observe the regulations?

MR. WIRT: Everybody's.

MR. KERRICK: I have been told that, while the railroads put in screens to prevent the sparks from flying out of the smoke-stacks, the engineers or firemen or both, will take them out as fast as they get in. There ought to be some man to see that they comply with the regulations of the law. We always thought that the railroads are the prime source of the fires and I believe today that they are the biggest sinners we have.

MR. WIRT: I know that the farmers generally blame the railroads for the majority of the fires; but, nevertheless, they have not produced the evidence yet and the men on the ground have not produced the evidence yet. The fact is that for a number of years those of you who have followed legislation in Pennsylvania realize that at every session some bills come in which try to make the railroads responsible for all forest fires that occur along the right of way, and

a number of other bills placing certain obligations and duties upon railroad companies, but you have also noticed, if you have kept in touch with legislation in Pennsylvania, that such bills either die in the Committee or shortly after. The fact of the matter is that the Department of Forestry has been attempting to place the forest fire problem on a definite, satisfactory, legislative basis since 1895, when Dr. Northup first drew up his forest fire bill. Forest fires have been talked about since 1782, and we had some legislation on forest fires even when Pennsylvania was a province, but with all this legislation, the Department of Forestry in the State has been waylaid and nothing very definite accomplished; but further, at this last session—how it ever happened I don't know, it was the biggest surprise to me, we got an act through the Legislation which made it possible for the Department of Forestry to formulate certain rules and regulations, which, after they had been passed upon by the Public Service Commission, would have to be lived up to by the railroad companies. Whether it was through my good graces in talking with some of the railroad officials, or just what providential influences aided us, I do not know, but at any rate the railroads did not come into this legislature and attack our forest fire bill; they let it go through.

Now the fact of the matter is this, that the large railroads of the State of Pennsylvania realize the trouble and danger of forest fires just as much as we do; the large railroads and efficient railroads, and they are co-operating with us right now without rules and regulations, but it is the little dinky railroads that we are going to make these rules and regulations for between this and the middle of the summer, and then we are going to see that they are enforced, but we do believe this, gentlemen, and in answer more directly to the gentleman's question, we do not believe that it should be the policy of the State Department of Forestry to employ inspectors of railroad engines.

The Department of Forestry is not a department of engineers; we are a department of foresters; we do believe that when certain rules and regulations are put into effect which will tend to reduce the number of forest fires, there should be an accompanying proposition; we now have in our act that when the railroad company sets fires, even after they have put into effect these rules and regulations which we have put upon them, and we can prove that they are responsible for the fire, they are liable to damages without any question as to whether they have a hole in their smokestack or not; in others words, we put the proposition up to the railroad company just like we do to the farmer. If you are careless in setting a fire or causing a fire to spread from your fire and do damage to somebody else, you are certainly responsible and it is simply shoving the responsibility up to the right fellow. Let every man bear the burden of his own responsibility and his own actions. Now that is just as fair for the railroad company as it is for the other fellows.

The unfortunate part in the proposition which you men have brought to us time after time has been,—well, here a farmer will go out and set fire to his brush or he will do something in his woodlands where he is directly responsible. The fire will go from his land on to

the other fellow's land and the other fellow will suffer damage; I am responsible for the fire and you can get me, I'll pay the damage, pay the suit, pay the costs and pay the penalty; but in the case of the railroad company, heretofore it has been a case of not being able to blame the railroad company because of the fact that in a court of law the jury and the judge as well would always say, "Now, did you see the spark come out of the engine and come over and light on the leaves and the fire start?" "No." "No case;" and we were ruled out of court.

I had five cases—or had on my desk in the last month—where we had statements from our fire wardens—if I get too lengthy, just cut me off—to the effect that these fires were caused by railroad engines, certain men saw them. We went right back and said, "Will such and such people who saw these fires start, go before a jury and swear to the fact that they saw the fire start?" "No, because certain men are employees of that particular railroad company." Now what are you going to do? In other words, you have got the evidence, but you don't have it; you have got the evidence, but you can't get the men to go into court and swear to what they say they know. In other words, they would lose their jobs.

What we propose to do is something like this, provide for a sort of co-operation between railroad companies and land owners along the right of way. It is possible to make what are known as fire breaks on either side of a railroad where the forest land is liable to fire. The railroad companies in a majority of cases—as a matter of fact, in Centre county, the New York Central Railroad Company this last fall cleared up, on both sides of the railroad, a strip of 300 feet at their own expense in order to prevent the spreading of forest fires from their engines, not by any law or regulations, but of their own free will and accord at the request of one of our officials, did it at their own expense. We expect to go after all of the railroads on that very proposition and where they do not do it, we are going to make it interesting for them. And on the other hand, where the individual land owner along such railroad wants to maintain a fire hazard so that every time an engine goes by there, he can sit and watch and actually see the sparks fall and then go and collect damages from the railroad company every year—where that fellow is not going to co-operate, we are going to make it interesting for him too, because in our new law, we have this very important clause inserted, that where certain conditions exist, either by reason of circumstances as they exist on the ground or by reason of the operation of any machinery, there is a fire risk so that such conditions or such operations may become the cause of damage to adjoining property, we can declare a thing a public nuisance and issue orders as to when that public nuisance must be abated, and if it is not abated within that certain length of time, a penalty for every day the nuisance still remains may be imposed.

Now we believe that we have the proper club, but we expect to go about it, not in a hammer and tongs fashion, but rather in the way of requesting co-operation from the people concerned, and I think we are going to get further that way than we will under some of the other legislative enactments that have been proposed and possibly, for the railroad companies at least, fortunately were never passed.

The CHAIRMAN: I am requested to announce that the photographer is at the front of the building and would like to have your smiling faces look into his instrument for a few minutes, after the adjournment of this meeting. The meeting is now adjourned until 1.30 this afternoon.

January 27, 1916, 1.30 P. M.

Vice President Studholme in the Chair.

The CHAIRMAN: I would like to take this opportunity to thank the members of the Board for conferring the honor upon me, as one of your Vice Presidents. - I esteem it a great honor to assist this Board in any way. I represent a county that has been very fortunate in her gifts from Nature, McKean county. We have had wonderful forests of pine and hemlock and beech and maple trees above the surface, and beneath the surface quantities of oil and gas, and it is only within recent years that we felt the necessity of developing our agricultural resources. I want to state to you the remark that our former Deputy Secretary made at our last institute held in McKean county; he said that the Department of Agriculture had had more inquiries for information from McKean county during the year 1915 than from any other county in the State of Pennsylvania. I have no doubt that some of you men might think, "Well, you certainly need all the information you can get on agricultural lines in McKean county;" and we realize this, but we have got to the point where we are willing to admit that we need the information and we have asked for this information. And what is better yet, we are beginning to apply this knowledge that we are gaining to our farms so that in the near future we hope to be able to take our stand beside the other counties in the northern tier, Warren, Crawford, Tioga and Bradford, and be counted as one of the agricultural counties of this State.

First on the program for this afternoon is reports of Standing Committees and Specialists, continued, and first, comes the Report on Feeding Stuffs, by Dr. George G. Hutchison.

MR. HUTCHISON: Now the hardest thing for me is to read; my mind works rather rapidly and when I have to read it is a little tiresome to me and I'd a great deal rather talk. May be you have realize that by this time, some of you, but I will start off. I am not going to read all this paper this afternoon, but I want to bring out some of the points in it. I want to state that I am under great obligations to the Chief Chemist for his aid and help in getting together the data we have here. He and I are sort of co-partners in the work we are doing in the department, you couldn't separate the chemist from me or myself from the chemist in our line of work, and he is a very modest gentlemen and I will say this to you, that the State owes a great deal to the Chief Chemist, Prof. Kellogg, for the interest he

has taken in our work. That is not written down here, I just want to pay a tribute to him while he is living because he may be a long time dead you know.

Mr. Hutchison then presented the following paper:

FEEDING STUFFS REPORT

By GEO. G. HUTCHISON

The work of the Department in enforcing the law regulating the sale of Feeding Stuffs during the year which has just closed has continued along the lines as in previous years, and as each year goes by the need of such a law becomes more apparent. It would be difficult to imagine what the condition or character of the Feeding Stuffs sold in Pennsylvania would be if we did not have such a law as is now on our statute books and which is being rigidly enforced. While much progress has been made in bettering the feeds sold in the State, it is still necessary to be on the watch for new feeds or by-products which from time to time, are being utilized for feeding purposes, to watch out for adulterants, and to make sure that the consumers of the State are receiving feeds correctly guaranteed and the full value of their money paid out for the same.

There are thirty-six (36) states which have feeding stuffs laws, five (5) that have general food laws which, in a measure, regulate the sale of feeding stuffs, and seven (7) which have no laws at all. In these states, therefore, which have no laws, a few of which are close to our borders, it is easy to imagine the character of the feeds sold in such states and it sometimes occurs that a feed intended to be sold where there is no regulation gets into Pennsylvania, as is shown by the fact that recently we found a certain brand of feed which had come into Pennsylvania which contained about 40% of ground peanut hulls. This is an instance of how the consumers are being protected by our own feeding stuffs law and by a special arrangement with the United States Department of Agriculture on interstate shipments. The Chief Chemist upon finding such a brand of adulterated feed being sold can report the case to the Federal authorities and thus our own Department working, with the Federal Department can protect the consumers from such frauds. The usual number of feeding stuffs registrations, which show about 1,200 different brands of feeds being sold in the State, are filed each year which assists greatly in enforcing the provisions of the act and enables us to keep in touch with the character of the various brands being sold.

One form of misrepresentation which the Department is endeavoring to correct, is the use of the so-called "sliding guarantees" for protein, fat and fiber which are not only misleading and not in agreement with the requirements of the act but which, in many cases, does not show the true composition of the feed, as is often found by analysis. Some idea of the importance of the work to the farmers and con-

sumers of our State can be gained from the fact that according to the Bureau of Statistics of our Department, there are the following number of heads of livestock within the borders of our State.

Dairy cows,	952,000
Horses,	596,000
Mules,	46,000
Other cattle,	644,000
Sheep,	806,000
Hogs,	1,186,000

Making a total of, 1,230,000

From what statistics can be secured, at least 600,000 tons of feeding stuffs are sold annually in the State, the greater portion of which is imported from other states; having a total valuation at a low average price of \$25. per ton, or fifteen million dollars. The amount of feed required to feed such a large number of livestock for one year would total at least, on a conservative estimate, 6 million tons. While Pennsylvania is a large agricultural state and produces great quantities of feed within its borders, it does not produce enough to meet this enormous need, which is one explanation of why such great quantities of feeds are imported from other states for home consumption. As the cities increase in size and the country develops along this line, the area of land devoted to producing food usually decreases which, in a large measure, has made the demand for mixed feeds so great.

Fifteen years ago when the feeding stuffs industry first commenced, this condition did not exist and many valuable by-products were thrown away as useless, but as the demand for feeds of all sorts has increased, every possible by-product that could be used for feed has been conserved and utilized, sometimes as straight feeds and in many cases as ingredients in the many brands of mixed feeds. From the reports made to this body from year to year, you have become familiar with most of the feeds or by-products now being used, but from time to time, new products are being utilized and during the past year the feeding value of three by-products has been discovered and these are now being used, namely, yeast and vinegar, dried grains, ivory nut meal and cocoa shell meal.

The yeast and vinegar dried grains were, before the recent embargo on exportation, being sold largely abroad but during the first part of the year our Department discovered that this product was being sold in the State as straight distillers' dried grains at about \$7 less per ton than the usual price for distillers' dried grains. After an investigation by our chemists and agents, and a visit to the plants where this material is being produced, it was discovered that instead of being distillers' dried grains it was the residue of the dried grains left from the manufacture of yeast and vinegar. As a result of this work, this product is now being sold in the State as yeast dried grains properly guaranteed for protein, fat and fiber. This material is a valuable by-product feed although it does not contain quite as much value of distillers' grains from corn but contains a little more than the distillers' grains from rye.

The ivory nut meal, referred to, is an interesting product as it is the ground cuttings from the ivory nut from which buttons are made. This material has a bony, hard structure, but when pulverized and ground into a fine meal, it possesses some feeding value and a portion of it is digestible. It has the following composition: Protein 4.50%, fat 0.85%, and fiber 8.30%. The law does not prohibit the sale of this particular material, and, therefore, we can make no objection to its use although in every feed on which it is used as an ingredient, it must be stated on the sacks or on the tags that it forms a part of the feed.

The cocoa shell meal has been used for about a year as an ingredient in mixed feeds and is the ground shells left from the bean from which cocoa is made. This product has the following average analysis: Protein 16%, fat 3.50%, fiber 12-14%. A study is now being made of the value as a feed of garbage tankage, and this may be placed on the market as an ingredient for mixed feeds later, although the process of manufacture has not developed far enough to warrant its being offered for sale. Other by-products of interest which some people are trying to mix in feeding stuffs is peat, which is sometimes called humus. This material contains a large proportion of sand and insoluble matter and the Department has refused to permit the sale of any feed in the State which contains this product as an ingredient.

The Department has received splendid support and co-operation in the work being done along this line, from the dealers and feed manufacturers of the State, and also of the United States. A few years ago an organization was formed, called the Association of Feed Control Officials of the United States, made up of the officials of each State which were in charge of the enforcement of the feeding stuffs laws. Our Department has been represented at these meetings by the Secretary of Agriculture, the Chief Chemist and the writer. Much valuable information has been secured as a result of these meetings, as special attention is paid to the study and discussion of the various by-products being used and definitions have been adopted for practically every product known to the trade. The definitions which, up to date, have been adopted are as follows and will be included in the report, but I will not take up your time in reading them now.

MEAL is the clean, sound, ground product of the entire grain cereal or seed which it purports to represent.

CHOP is a ground or chopped feed composed of one or more different cereals or by-products thereof. If it bears a name descriptive of the kind of cereals, it must be made exclusively of the entire grains of those cereals.

SCREENINGS are the smaller imperfect grains, weed seeds and other foreign material having feeding value, separated in cleaning the grain.

ALFALFA MEAL is the entire alfalfa hay, ground, and does not contain an admixture of ground alfalfa straw or other foreign materials.

BLOOD MEAL is ground dried blood.

MEAT SCRAP AND MEAT MEAL are the ground residues from animal tissue exclusive of hoof and horn. If they contain any con-

siderable amount of bone, they must be designated **MEAT and BONE SCRAP** or **MEAT AND BONE MEAL**. If they bear a name descriptive of their kind, composition or origin, they must correspond thereto.

DIGESTIVE TANKAGE is the residue from animal tissue exclusive of hoof and horn, specially prepared for feeding purposes by tankage under live steam, drying under high heat, and suitable grinding. If it contains any considerable amount of bone, it must be designated **DIGESTIVE MEAT AND BONE TANKAGE**.

CRACKLINGS are the residue after partially extracting the fats and oils from the animal tissue. If they bear a name descriptive of their kind, composition or origin, they must correspond thereto.

BREWERS' DRIED GRAINS are the properly dried residue from cereals obtained in the manufacture of beer.

DISTILLERS' DRIED GRAINS are the dried residue from cereals obtained in the manufacture of alcohol and distilled liquors. The product shall bear the designation indicating the cereal predominating.

MALT SPROUTS are the sprouts of the barley grain. If the sprouts are derived from any other malted cereal, the source must be designated.

BUCKWHEAT SHORTS OR BUCKWHEAT MIDDINGS are that portion of the buckwheat grain immediately inside of the hull after separation from the flour.

CORN BRAN is the outer coating of the corn kernel.

CORN FEED MEAL is the sifting obtained in the manufacture of cracked corn and table meal made from the whole grain.

CORN GERM MEAL is a product in the manufacture of starch, glucose and other corn products, and is the germ layer from which a part of the corn oil has been extracted.

GRITS are the hard, flinty portions of Indian corn, without hulls and germs.

HOMINY MEAL, HOMINY FEED, OR HOMINY CHOP is a mixture of the bran coating, the germ and a part of the starchy portion of the corn kernel obtained in the manufacture of hominy grits for human consumption.

CORN GLUTEN MEAL is that part of commercial shelled corn that remains after the separation of the larger part of the starch, the germ and the bran, by the processes employed in the manufacture of cornstarch and glucose. It may or may not contain corn solubles.

CORN GLUTEN FEED is that portion of commercial shelled corn that remains after the separation of the larger part of the starch and the germ by the processes employed in the manufacture of cornstarch and glucose. It may or may not contain corn solubles.

COTTONSEED MEAL is a product of the cottonseed only, composed principally of the kernel with such portion of the hull as is necessary in the manufacture of oil; provided that nothing shall be recognized as cottonseed meal that does not conform to the foregoing definition and that does not contain at least 36 per cent. of protein.

PRIME COTTONSEED MEAL must be finely ground, not necessarily bolted, of sweet odor, reasonably bright in color, yellow, not brown or reddish, free from excess of lint, and must contain at least 38.6 per cent. of protein.

CHOICE COTTONSEED MEAL must be finely ground, not necessarily bolted, perfectly sound and sweet in odor, yellow, free from excess of lint and must contain at least 41% of protein.

GOOD COTTONSEED MEAL must be finely ground, not necessarily bolted, of sweet odor, reasonably bright in color, and must contain at least 36 per cent. of protein.

COTTONSEED FEED is a mixture of cottonseed meal and cotton seed hulls, containing less than 36 per cent. of protein.

COLD PRESSED COTTONSEED is the product resulting from subjecting the whole undecorticated cottonseed to the cold pressure process for the extraction of oil, and includes the entire cottonseed less the oil extracted.

GROUND COLD PRESSED COTTONSEED is the ground product resulting from subjecting the whole undecorticated cottonseed to the cold pressure process for the extraction of oil, and includes the entire ground cottonseed less the oil extracted.

FLAX PLANT BL-PRODUCT is that portion of the flax plant remaining after the separation of the seed, the best fiber and a portion of the shives, and consists of flax shives, flax pods, broken and immature flax seeds and the cortical tissue of the stem.

LINSEED MEAL is the ground product obtained after extraction of part of the oil from ground flaxseed screened and cleaned of weed seeds and other foreign materials by the most improved commercial processes.

OIL MEAL is the ground product obtained after the extraction of part of the oil by crushing, cooking and hydraulic pressure, or by crushing, heating and the use of solvents from seeds which have been screened and cleaned of weed seeds and other foreign materials by the most improved commercial processes. When used alone the term "oil meal" shall be understood to designate the product obtained from screened and cleaned flaxseed. When used to cover any other product the name of the seed from which it is obtained shall be prefixed to the word "oil meal."

OLD PROCESS OIL MEAL is the ground product obtained after extraction of part of the oil by crushing, cooking and hydraulic pressure from seeds screened and cleaned of weed seeds and other foreign materials by the most improved commercial processes. When used alone the term "old process oil meal" shall be understood to designate the product obtained from partially extracted, screened and cleaned flaxseed. When used to cover any other product the name of the seed from which it is obtained shall be prefixed to "old process oil meal."

NEW PROCESS OIL MEAL is the ground product obtained after extraction of part of the oil by crushing, heating and the use of solvents from seeds screened and cleaned of weed seeds and other foreign materials by the most improved commercial processes. When used alone the term "new process oil meal" shall be understood to designate the product obtained from partially extracted, screened and cleaned flaxseed. When used to cover any other product the name of the seed from which it is obtained shall be prefixed to "new process oil meal."

UNSCREENED FLAXSEED OIL FEED is the ground product obtained after extraction of part of the oil from unscreened flaxseed

by crushing, cooking and hydraulic pressure, or by crushing, heating and the use of solvents. When sold without grinding the unground product shall be designated as "unscreened flaxseed oil feed cake."

INGREDIENTS OF UNSCREENED FLAXSEED OIL FEED—Ground cake from partially extracted flaxseed and foreign seeds (wheat, wild buckwheat, pigeon grass, wild mustard, etc.)

SCREENINGS OIL FEED is the ground product obtained after extracting part of the oil by crushing, cooking and hydraulic pressure, or by crushing, heating and the use of solvents from the smaller imperfect grains, weed seeds and other foreign materials having feeding value separated in cleaning the grain. The name of the grain from which the screenings are separated shall be prefixed to "screenings oil feed."

OAT GROATS are the kernels of the oat berry.

OAT HULLS are the outer chaffy coverings of the oat grain.

OAT SHORTS are the covering of the oat grain lying immediately inside the hull, being a fuzzy material carrying with it considerable portions of the fine floury part of the groat obtained in the milling of rolled oats.

CLIPPED OAT BY-PRODUCT is the resultant by-product obtained in the manufacture of clipped oats. It may contain light, chaffy material broken from the ends of the hulls, empty hulls, light, immature oats and dust. It must not contain an excessive amount of oat hulls.

RICE BRAN is the cuticle beneath the hull.

RICE HULLS are the outer chaffy coverings of the rice grain.

RICE POLISH is the finely powdered material obtained in polishing the kernel.

WHEAT BRAN is the coarse outer coatings of the wheat berry obtained in the usual commercial milling process from wheat that has been cleaned and scoured.

SHORTS OR STANDARD MIDLINGS are the fine particles of the outer and inner bran separated from bran and white middlings.

WHEAT WHITE MIDLINGS OR WHITE MIDLINGS are that part of the offal of wheat intermediate between shorts or standard middlings and red dog.

SHIPSTUFF OR WHEAT MIXED FEED is a mixture of the products other than the flour obtained from the milling of the wheat berry.

RED DOG is a low grade wheat flour containing the finer particles of bran.

WHEAT BRAN WITH MILL RUN SCREENINGS is pure wheat bran plus the screenings which were separated from the wheat used in preparing said bran.

WHEAT BRAN SCREENINGS NOT EXCEEDING MILL RUN is either wheat bran with the whole mill run of screenings of wheat bran with a portion of the mill run of screenings, provided that such portion is not an inferior portion thereof.

TENTATIVE DEFINITIONS.

YEAST OR VINEGAR DRIED GRAINS are the properly dried residue from the mixture of cereals, malt and malt sprouts (sometimes cottonseed meal) obtained in the manufacture of yeast or vinegar, and consist of corn or corn and rye from which most of the

starch has been extracted, together with malt added during the manufacturing process to change the starch to sugars, and malt sprouts (sometimes cottonseed meal) added during the manufacturing process to aid in filtering the residue from the wort and serve as a source of food supply for the yeast.

OIL CAKE is the residual cake obtained after extraction of part of the oil by crushing, cooking and hydraulic pressure from seeds screened and cleaned of weed seeds and other foreign materials by the most improved commercial processes. When used alone the term "oil cake" shall be understood to designate the product obtained from partially extracted, screened and cleaned flaxseed. When used to cover any other product, the name of the seed from which it is obtained shall be prefixed to "oil cake."

GROUND OIL CAKE is the product obtained by grinding oil cake. When used alone, the term "ground oil cake" shall be understood to designate the product obtained from partially extracted, screened and cleaned flaxseed. When used to cover any other product the name of the seed from which it is obtained shall be prefixed to "ground oil cake."

GROUND FLAXSEED OR FLAXSEED MEAL is the product obtained by grinding flaxseed which has been screened and cleaned of weed seeds and other foreign material by the most improved commercial processes.

PALM KERNEL OIL MEAL is the ground residue from the extraction of part of the oil by pressure or solvents from the kernel of the fruit of the *elaeis guineensis* or *Elaeis malanococoa*.

IVORY NUT MEAL is ground ivory nuts.

PEANUT OIL CAKE is the residue after the extraction of part of the oil by pressure or solvents from peanut kernels.

PEANUT OIL MEAL is the ground residue after the extraction of part of the oil from peanut kernels.

UNHULLED PEANUT OIL FEED is the ground residue obtained after extraction of part of the oil from whole peanuts, and the ingredients shall be designated as "PEANUT MEAL AND HULLS."

The three new by-products referred to were studied by this Association and definitions given for the same. Recently it has come to our attention, and it has also been referred to this Association, of the presence of tin in certain grades of refuse middlings from the manufacture of tin plate. This difficulty is now being overcome by the use of magnets which takes out all particles of tin which might be present in the product. In order to be absolutely sure, however, that no harm can come from the feeding of this material, the Live-stock Sanitary Board of our Department is conducting a feeding experiment with this feed. It would be well, at this time, to call your attention to the fact that one brand of so called refuse middlings was being sold which contained a large amount of ground peanut hulls, but as the law prohibits the sale of peanut hulls in any feed in the State, we have refused to permit this product to be sold, and therefore, if any of you gentlemen have any doubt as to the character of refuse middlings, it would be well to send samples to the Chief Chemist of the Department who will tell you whether or not any peanut hulls are found in it.

Owing to the damage caused to the oat crop during the year, much of this grain became damaged and in order that it could be sold in

the trade, bleachings of the oats has been resorted to. From what we can learn no harm can come from the feeding of bleached oats although, of course, the oats are not of the same character as those which have not been damaged and it is claimed by some that the germination power of the oat is destroyed by bleaching.

I wish to call your attention also to the fact that some of the cottonseed meals being offered for sale this year, are not of as high a protein content as has usually been the case. This condition has been caused by the presence of more hulls in the meal than usual. It seems that because of the war abroad, there has been a big demand for lint which formerly brought about 2 cents per pound which now is being sold at about 7 cents per pound. This means that the manufacturers are cleaning all the lint they possibly can off the hulls which makes it difficult to separate as much of the hulls from the meal as could be done before the lint was removed. Where such meals are running low in protein, and contain excessive amount of cottonseed hulls, the Department has insisted that they be sold as a cotton seed feed. It would be well, when purchasing this product for you to have samples analyzed in our Laboratory, if you have any doubt that the guarantees will not be met.

A large proportion of the feed found on our markets consists of molasses feeds and chicken feeds. A claim is made by a reliable authority that at least 2 million tons of molasses feeds were sold in the United States last year. These feeds are of a better grade than have ever been sold before in the State and are improving from year to year. As is well known, they are made up of various by-products to which molasses has been added. In many cases the main ingredient used is grain screenings meal. This material is finely ground and pulverized until it resembles flour in its fineness and the pulverizing process destroys any whole weed seeds which might be present.

The chicken feeds, judging from the samples examined in our Laboratory, are of a better grade than ever before, as they do not appear to contain such quantities of weed seeds which the law prohibits. Many of these feeds are composed of the second and third grade cereal grains which are not used for making flour. The fact that the quality of the feeds being sold has improved, has made it unnecessary to bring but a few prosecutions during the last year. This situation is gratifying to us. From this information it will be apparent that this line of work which the Department is doing is of greater importance than usually can be realized or learned. It requires constant care on the part of our laboratory force to watch out for adulterants and violations and only scientific men carefully trained can be trusted with this work.

This brings me to a subject of vital importance to all those interested in this work, that is the needs of our Department for the proper enforcement of the Feeding Stuffs Law.

At the last session of the Legislature our appropriation for this work was reduced one-third of what we had been receiving and this reduction did not permit us to make any advancement forward in the line of special investigations and has made it impossible for us to investigate all cases properly where complaints are made. We are also called upon to show an exhibit of feeding stuffs to the various fairs, from time to time, and we have not been able to do this in all

cases. It is highly desirable, therefore, that the appropriation for this work for the next fiscal period should be put back to its original amount. I call your attention to this matter in order that you may know of the situation and also as you may have an opportunity to help us out in this respect. We haven't examined quite as many samples of feeding stuffs last year as we did the previous year for the reason that the work was interrupted by moving the laboratories. The Board of Public Grounds and Buildings have fitted up a building in the Capitol Park Extension zone for the use of the laboratories of the Department and have moved the equipment from the Capitol to this building which makes it possible for all the chemical work of the Department to be done in a thorough and economical manner.

During the year our Special Agents collected 1,264 official samples of feeding stuffs which were submitted to the Chief Chemist for analysis. All of these samples were examined microscopically and analyzed for protein, fat and fiber and reports made to the manufacturers and the dealers from whom they were secured. In addition to this there were 225 special samples of feeding stuffs sent in for analysis by residents of the State.

The following is a list of the counties visited and the number of samples of feeds collected in each which I will not read at this time but which will be included in the published report. There were a number of towns visited in which no sample were secured as they represented brands, samples of which had been taken in other towns, however, we feel that the State was well covered during the year of inspection.

Name of County	No. of Samples
Adams,	4
Allegheny,	76
Armstrong,	13
Beaver,	35
Bedford,	18
Berks,	36
Blair,	36
Bradford,	24
Butler,	36
Cambria,	40
Cameron,	8
Centre,	16
Chester,	24
Clearfield,	26
Clinton,	13
Crawford,	26
Cumberland,	12
Dauphin,	24
Elk,	23
Erie ,	34
Fayette,	26
Forest,	3
Huntingdon,	10
Indiana,	26
Jefferson,	36

Juniata,	8
Lackawanna,	12
Lancaster,	67
Lawrence,	13
Lebanon,	35
Luzerne,	48
Lycoming,	34
McKean,	28
Mercer,	16
Mifflin,	28
Montour,	8
Northumberland,	30
Perry,	2
Philadelphia,	10
Potter,	10
Somerset,	31
Susquehanna,	12
Tioga,	50
Union,	18
Venango,	21
Washington,	36
Westmoreland,	68
York,	44
Total,	1,264

I cannot complete this report without referring to the former Secretary of Agriculture, Hon. N. B. Critchfield, whose twelve years of service in the Department has been of much benefit and help to us all. Mr. Critchfield always took a special interest in the feeding stuffs work, going into all details of the matter and never left a hand unturned to do all that was possible for the betterment of the feed conditions in the State. In his resignation we lose his valuable advice and help in this line of work. However, his successor, Hon. Charles E. Patton our present Secretary, has also shown a great interest in this line of work and the former policies of the Department will be continued.

The CHAIRMAN: If there are no objections, this report will be accepted and published with the proceedings of the meeting. Is there any discussion? I might say that I hope that the garbage tankage is to be a food for stock, otherwise we will have it as a popular form of breakfast food.

MR. HUTCHISON: The young fellow who is pushing that enterprise is a man with a sharp face, don't look like there was much in him, but he is as sharp as a tack and is trying to put it on the market. In regard to the Seed Bulletin, we have some copies there; and if you have not all received them, we will be glad to give them to you and by next year we hope to have a Paint Bulletin. A paper on paint was read here but it did not bring one bit of discussion; I believe you chaps have been getting mighty good paint or you would have got into that scrap. That is a thing that has been defrauding the people of this Commonwealth; it has made millionaires out of some people.

We met some of them in Philadelphia, but it has put stuff on your houses that has scaled off and is worthless, but we hope by another year, if everything goes right, to be able to give you some information on that line.

The CHAIRMAN: The next report will be on Soils and Crops, by Prof. Franklin Menges.

PROF. MENGES: Mr Chairman, Ladies and Gentlemen: I will not refer to any criticisms along soil lines, but I am going to confine my report entirely to crops and crop rotations and if you have any criticisms to offer, I wish you would offer them, because I am going to say some things that might not seem practical to you people and if they are not practical, I want to know it, in fact I want to know it especially because what I am going to read to you has been tried for a short time and really so short that we have not been able to demonstrate whether it is going to be a proposition that it will be possible to carry out along definite agricultural lines.

Prof. Menges then submitted the following report:

REPORT ON SOILS AND CROPS

By **PROF. FRANKLIN MENGES**

In last year's report we discussed the general methods of crop rotation follows throughout the State, and, in closing stated that in all sections of the State, crop rotation should be so arranged that advantage may be taken of cool weather cereal and leguminous crops in the higher and northern sections, and dry weather cereals and leguminous crops for the dry soils, and of the warm and hot weather cereals and leguminous crops for the warmer and hot areas of the State, so as to make crop rotations do what all rotations should do, namely, produce the largest amount of human nutrition and at the same time improve the soil permanently. A beginning has been made by the Bureau of Practical Agricultural Educational Work of the Department of Agriculture of the State along this line by introducing into the regular four year's rotation with every soil exhausting crop, a soil improving crop. This work was started three years ago in the northern part of York county on the mesozoic sandstone and shale soils on a farm which had been so reduced in fertility that the owner said to the writer that he could not get a renter for the place who would stay on it longer than a year. An examination of the soil revealed the fact that the organic matter had been so reduced that virtually all fertility for the growing crop had to be obtained from mineral sources because the humus still in the soil had changed into the inert condition and the quantity was so small that if it had been active humus it would have furnished but little fertility, and the soil was chemically inactive except for the little activity maintained by the commercial fertilizer applied annually, which is an activity not conducive to large crop yields, especially in sandy soils, and therefore

the first and great thing to do was to devise a method for making humus on a soil which had to yield crops and where there was no manure, by raising soil improving crops with or following the soil exhausting crops.

This operation was started with the corn crop. A fertilizer composed of 1,200 pounds basic slag, 600 pounds 7% animal tankage and 200 pounds muriate of potash in the ton, was applied with the corn in the row at the rate of 200 pounds per acre, and before the last cultivation, Whippoorwill cowpeas, which had been inoculated with inoculating material from the Department of Agriculture at Washington, were sown in the corn at the rate of one bushel per acre and covering with the cultivator. The middle of September, when the corn had ripened, which, considering the condition of the soil, was a splendid crop, was cut and when husked yielded 90 baskets of ears per acre. The cowpea vines were in many instances more than two feet long with an average length of 18 inches, and covered the ground completely. As previously indicated, the soil was sandy and the cowpeas and corn stubble were cut up and mixed with the soil with a disk harrow by harrowing the ground three or four times. After the land had been prepared in this way, it was seeded with wheat, and with the wheat 200 pounds per acre of the same mixture of fertilizer as had been applied with the corn. The following spring, after the middle of April, inoculated hulled white blossom sweet clover seed was sown with the wheat at the rate of 3-4 quarts per acre and covered with a weeder. The seed came up and grew sufficiently tall that some tops were cut off when the wheat was harvested. The sweet clover was allowed to grow until the middle of August. When it had reached a height of 15 to 20 inches, it was plowed down and the land seeded with wheat again, and with the wheat the following spring, red and alsike clovers were sown, and in this way a soil improving crop was raised with every soil exhausting crop, or a soil exhausting crop followed with a soil improved crop in the old four years' rotation. As previously stated, a crop rotation should be so arranged that it will produce the largest amount of human food that can be produced in the individual soils and under prevailing climatic conditions and under the management of each individual farmer, whether some phase of the livestock or semi-livestock and grain farming operation be followed or grain and hay forming or seed production which will, in the near future become a necessity in this State, or any other phase of agriculture or horticulture, and, in addition, improve the fertility of the soil. These are not easy things to do but can be done.

The livestock industry should, in a much larger way, be the prevailing agricultural industry of the State, and in order to make it more attractive financially, crops must be produced on the farm to feed the animals to get away from paying profits coming and going, and to do this, rotations established by means of which the largest amount of a high feeding value roughage and grain foods can be produced. A rotation for the southern part of the State which will furnish a large amount of a high feeding value roughage and at the same time improve the soil, can be arranged by seeding winter rye in the corn stubble in the fall of the year, and in the spring, as soon as the ground is sufficiently dry to run a weeder or a spike-tooth harrow over it, so

with the rye equal quantities of red and mammoth clovers, the rye cut for hay or silage when it is heading, which, in the southern part of the State, will be early in May; allow the clover to grow until it is well headed, which will be sometime in July or August, cut for hay and allow the second crop to remain on the field. In this way two crops of high feeding value hay can be produced and one soil improving crop, all in one season. The following spring this clover sod is plowed down and the land prepared and planted with corn and the corn field of the previous year which had been sown with rye, used for the hay field, and in this way a farm can be divided into two fields, one for hay and the other for corn, and with the right use of the manure, the soil improved continuously.

An effort has been made to start this kind of work in a few sections of the State because of soil and climatic conditions being especially favorable; but a rotation which is more attractive to me than the above outline is now being practiced on a 300 acre farm by Martin Cope's son, Lancaster county. These people raise sweet corn which they dry and sell as their money crop. The husks and cobs are cut up and fed to cattle, and the corn stalks which, as all corn stalks do when the ears are plucked at the time they are in the best condition for drying, accumulate sugar in a few weeks until they contain as much as 12 to 14 per cent., when they are cut and either siloed or tied up in bundles and carefully dried and fed to cattle, furnishing approximately as rich a carbo-hydrate food as an ordinary corn crop. At the last cultivation of this corn, red and alsike clovers, alfalfa and timothy are sown with the corn, and the following year anywhere from 2 to 4 crops of hay are cut off this land; the first crop mixed hay made up of timothy, red and alsike clovers while the second and third crops are largely of alfalfa. These rotations furnish a large amount of roughage and corn but not a sufficient amount of high feeding value protein and grains, and therefore either part of the sod field must be planted in the southern section of the State with soy beans and in the central and northern part with Canada field peas, or part of the field seeded for hay must be used for raising these crops.

It may be well to state that one bushel of soy beans ground with two bushels of corn will make a splendid grain ration for dairy cows, but it is likely that with well nigh all farmers throughout the larger part of the State, the longer rotations such as the three years for the central and northern and higher areas made up of corn followed with Canada field peas and oats, and the Canada field peas and oats with clovers and, wherever possible, alfalfa, and in the southeastern sections, a rotation of corn, soy beans and, in some sections, cow peas and alfalfa, will prevail for a long time.

As previously stated, the raising of clean, pure seed of good vitality has become a question of supreme importance in the State and through the introduction of shorter rotation, this demand will be much enlarged, which, with a large acreage of sandy, loamy, warm late fall and early spring farming soils splendidly adapted for raising fall or early summer ripening crops, such as crimson clover, followed with a dry hot weather early fall ripening crop such as the cow pea and sweet clover, and in the more loamy soils, with soy beans for seed, this demand can be supplied and the land continually improved.

Rotations of this character have been outlined and started in a small way on the sandy and shaly soils derived from the Clinton strata in Juniata county.

The CHAIRMAN: If there are no objections, this report will be received and published with the proceedings of the meeting.

MR. KEIPER: I would like to ask the gentleman is there any information or is there anybody here that has any information on spring wheat? I have exhausted our State College and the Department at Washington and cannot get any information. I am about to get some spring wheat from Montana and Dakota and try it. Both the State College and the Agricultural Department at Washington would like to have the information I get.

PROF. MENGES: Where are you located?

MR. KIEFER: Here in Dauphin county.

PROF. MENGES: You are too far south for spring wheat unless you can sow it in March. If you have land that you can farm and sow the wheat up until the middle of March, it may do all right. You know wheat is a cool weather plant and it does best if it can develop in cool weather and then ripen in pretty dry, hot weather. That is what makes Kansas wheat. Now in the northern sections, you know they have climatic conditions that suits exactly; they can sow their wheat early and it will ripen when they have little rains during July and August, and that makes their splendid, hard wheat, a condition that does not prevail here, normally.

A Member: You will succeed for one year, then I am afraid that you will get a very inferior quality.

PROF. MENGES: Yes, that has been the experience; if you were located in Bradford, Tioga, or even in Susquehanna counties it would be different.

A Member: Of Lackawanna county?

PROF. MENGES: Your conditions are good for some other things. If you were located up there, I think you might try it with some advantage, but I am pretty sure you will make a failure of it down here, for the reasons I have stated.

MR. SEAMANS: I will say for the information of the gentleman that we procured seed from Wisconsin, spring wheat last spring on my farm, and sowed four acres and we had a fairly good crop, we thought, we harvested 100 bushels from four acres, and about one acre of it went down, it was a little too wet. That has been our first experience in sowing spring wheat for some 20 or 25 years, but we have been well satisfied with the crop.

MR. FENSTERMACHER: I tried out a good substitute for spring wheat, and that is Kansas turkey red, a winter wheat almost the same quality as the spring wheat. I had the local miller test it and the chemist test it and they pronounced it about as good. But a peculiar thing about it, they would not pay me the price that the spring wheat would cost delivered at their mill.

MR. KEIPER: Did you plant it in the spring?

MR. FENSTERMACHER: No; the yield will be best, the straw is short and the grain excellent; it makes the finest chicken feed in the world. But there was the condition, the miller would not give me the price he would have to pay for the same grade of wheat bought in the west; it was unprofitable because it did not yield enough money.

PROF. MENGES: The best crop or the best paying crop that can be procured in those northern sections is the Canada field pea and oats. There is no question, I think, about that any longer, and it would pay our friends to follow that three years rotation, corn, Canada field peas and oats and grass and wherever possible, alfalfa. I do not say that alfalfa will do well in all sections of the State, because it will not, but wherever it is possible, I think that rotation would pay our people splendidly. Now there are some sections where the corn does not do well, and there I would change the rotation a little again.

MR. HUTCHISON: Speaking of alfalfa, I did not refer to it in this report, but I have been encouraging the farmers in Huntingdon county to grow alfalfa, and in our township, the best limestone township, the best limestone land in Pennsylvania, there's over a hundred acres of alfalfa doing well. A few years ago, you could not persuade a farmer at all to sow in it. Those of you who get The Stockman and Farmer saw a large field of 40 acres of alfalfa last year accredited as coming from Blair county near Tyrone, but that was grown out in old Huntingdon county. Dr. Beck has a whole lot of good things up there, but they want to take credit for this alfalfa in Blair county; it's over the river in our township and that man is raising it and doing good on that farm, that is growing that alfalfa. Now here is something there may be a dispute on, but that man last year produced on that farm \$6,000 worth of products sold off of that farm in that township. He is about 2 miles from Tyrone. I do not want to go into the detail. He keeps a dairy, he retails the milk, keeps hogs and he has his alfalfa to feed his cows and his name is John Campbell; he is prosperous and I had him at an institute Saturday. That is just one township where the man is farming and the backbone of his feed is alfalfa and he is not paying \$25. and \$30. a ton to the dealer for it, he is raising it there on that limestone land. A few years ago every one said, "What is the use of your trying alfalfa here? You cannot grow it." They are growing it there and Mr. Peck and Mr. Grasier and all those dairymen are sowing alfalfa and an abundance of it. Mr. Leidy has a number of acres of it, but if we people up at the foothills of the mountain can do it up there, why can't you raise alfalfa all over this state and stop this enormous feed bill and the money you are paying out to the western people for growing alfalfa way beyond the Mississippi and shipping it here? Get to thinking about it, you institute men, you directors. Go out to your work and talk alfalfa to these people, and if they miss one year, don't get discouraged. Mr. Campbell missed it the first year but stuck to it. Get a little stick-to-it-iveness; that's a pretty good word, though it is not a college word, Dr. Sparks, but that will win in this farming proposition if you put the stuff into it.

PROF. MENGES: I am very glad that Mr. Hutchison referred to this matter. This work has been started all along the line, so far as I have been able to do anything. Senator Fox, whom a great many of you know, has a little farm in Cumberland county, and last summer a year ago we started with alfalfa there, in preparing for alfalfa, we sowed the land the previous fall with rye. We plowed down the rye and the following May sowed the land with cow peas, inoculated the seed, plowed down the cow peas in August and sowed the land with alfalfa, and last summer Senator Fox had his first crop of alfalfa; he is down here in the Kunkle building, go and ask him about it. He harvested five tons of alfalfa hay from an acre the first season, and his land is not any better than thousands of acres of the same formation, which is the Hudson River shale, in this section of the State.

MR. KEIPER: I think it would be interesting for all the delegates to know something about Soudan grass. All the papers made a great deal of clamor in the last year and I sent to Texas and got enough seed for five acres. It was pretty late when we got it planted, on account of the wet season and other crops being in the way, and they said it would grow, made all kinds of claims for it growing on wet land, dry land and any other kind of land, so I put it in a damp field, planted it about the first day of June, fifteen pounds to the acre, broadcast and harrowed it in. I had two splendid crops of Soudan hay and the cattle don't seem to be able to get enough of it. I think with that little experiment, if I go a little further and if the rest of you try it out here in the State, that we will have a crop that will very largely take the place of alfalfa hay, give us more feed for roughage and, the claim is made, will enrich our soil. They claim that that is one of its best points, the soil enrichment coming from the large roots and the large number of stalks, I counted 47 stalks from one grain; it is a great soil enricher.

The **CHAIRMAN:** Is there any more discussion on this report?

MR. J. ALDUS HERR: If the Chair so desires, I have the report of the Committee on Resolutions.

The **CHAIRMAN:** If there is no objection, we will receive that report at this time.

Mr. Herr then presented the report of the Committee, as follows:

REPORT OF RESOLUTIONS COMMITTEE.

We, your Committee on Resolutions would offer the following as our report:

Resolved, That we deeply regret that an amount of important work in the Department of Agriculture and State College remains incomplete by reason of seeming necessity for a reduction in the appropriations to these organizations by the last Legislature, and sincerely trust that the forthcoming Legislature will make full appropriations to these agencies.

Whereas, We, the members of the State Board of Agriculture of Pennsylvania, feel that the work of our State Police has been of incalculable benefit and help to the people of our State, especially

in the rural districts where, of necessity, our homes are exposed to trespass and other lawless acts. They have given protection and assistance in time of need; and, whereas, the great work they have done in preserving the natural resources of our State, such as the forest and game, and in enforcing the laws regarding the protection of our workers, our industries and commercial interests; and, whereas, their skill and service in times of misfortune, floods, fires and pestilence, in the control of which they have co-operated with the local and State officials, has been of untold value; be it

Resolved, That we urge the continuance of the State Police in their present form and that their membership may be increased as the needs of the State require.

Resolved, That we, the members of the State Board of Agriculture, hereby express our appreciation of the long and most excellent service of our late Secretary of Agriculture, Hon. N. B. Critchfield; and, further resolve that we recognize the untiring efforts and work of our former Deputy Secretary of Agriculture and Director of Farmers' Institutes, Hon. A. L. Martin, under whose management the Institutes of the State have reached a high standard; and, be it further

Resolved, That recognizing the great work that has been accomplished through the Farmers' Institutes and corps of Farm Advisers, that we heartily endorse these features of our educational work in connection with the Department of Agriculture, and would recommend that our Legislative Committee, at the forthcoming session of the Legislature, ask and work for a larger appropriation to carry on the work.

Resolved, That we, the members of the State Board of Agriculture, welcome as our chief, the newly appointed Secretary of Agriculture, the Hon. Charles E. Patton, and hereby assure him of our hearty co-operation in the great work to which he has been called.

Whereas, Believing that our game laws should be amended as follows: First, amending the game laws to prohibit the killing of Quail; second, Deer hunting season should be from November first to fifteenth; third, there should be a closed season for Ruffed Grouse embracing three years.

Resolved, Therefore, that our Legislative Committee bring these amendments, as above noted, to the attention of the forthcoming Legislature, and use all possible means to have them enacted.

Resolved further, That we ask the County Agricultural Societies and Allied Associations to pass similar resolutions.

(Signed)

J. ALDUS HERR, Chairman.
JOHN A. WOODWARD.
B. F. KILLAM,
GEO. G. HUTCHISON,
WM. C. BLACK,

Committee.

The CHAIRMAN: Gentlemen, what is your pleasure in regard to this report?

On motion of Mr. Brong, the report of the Resolutions Committee was adopted.

The CHAIRMAN: Now we were to have had at this time an address by Hon. A. F. Lever, on Agriculture, and I am very sorry to inform you that, on account of sickness in the family he is unable to be with us today. Most all of our discussions or a lot of our discussions today and yesterday have brought up the question of better marketing facilities, and I am very glad to announce that Mr. Dorsett has kindly consented to take this time and give us a talk on marketing. (Applause).

MARKETING

By E. B. DORSETT

Mr. Chairman and Members of the Board and Fellow Workers: I deem it an honor and a privilege to address this intelligent body; but naturally I shrink from taking the place of a man of such prominence as Congressman Lever. As has been stated by your Chairman, in all these meetings, thus far, the one problem that seems to be bothering you is, that of better market facilities. I am satisfied that there is no problem confronting the farmer today that is of such vital importance to him as adequate marketing facilities. I would not in the least discourage the increased production that we hear about, but I am firmly convinced that the farmer is not so much worried today about producing the crop as he is about marketing it after it has been produced, and I believe that the greatest problem that confronts you today is, "How Can I Get That Product to Market At The Least Expense and Get The Most Out of It?" I know that we have many remedies, many solutions of this great problem, and I know that there are many theories and there is much criticism, but I want to say to you, fellow farmers and members of the Board, that it is much easier to criticise than it is to bring forth a definite plan of action. We have what might be called two forms of criticism, constructive and destructive, and we have plenty of men who are long on destructive and short on constructive criticism. We have plenty of men who can tear down, but we do not have men enough who can build up. It takes more brains to build up than it does to tear down, and I think that Lincoln hit the nail squarely on the head when he said that before one tears down the house which one has built, he must first build one for himself; and so in this great problem of marketing, it requires the earnest co-operation of all agencies interested in the uplift of agriculture.

I want to call your attention right here to one fact that has cropped out here at this meeting and has found its way into the columns of the newspapers about the overlapping of interests. It is not for me here to say where it came from or who is back of it, but I want to say this to you, that we cannot afford, as men interested in agriculture, to allow any outside interest to keep us apart. (Applause) Some years ago, down in the south, when that great Civil War was going on, a great general met one of the colored gentlemen one day and he said, "Sambo, why is it that you are not at the front fighting? Do you not know that this war is for you?" Sambo looked at him a moment, then he said, "Massa, when two dogs fight over a bone, the bone don't fight." (Laughter) Now that is the situation in Pennsylvania today; if we are going to do anything along the line of

marketing, we must have thorough co-operation. But I haven't time this afternoon to cover this field as I would like, and I did not know, until noon, that I was to say anything on this subject, and fortunately for you and unfortunately for me, I have not had time to prepare a manuscript or even notes; but I want to say to you that there are three great factors that we need as farmers and as men interested in agriculture. The first is organization, the second is education and the third is co-operation.

ORGANIZATION

With these three great factors at work, I want to say to you that we can cover the field thoroughly. Now, in just touching on the first, that of organization, I want to say to you that no great achievement has ever been accomplished save through organization. You can see that here with this Board of Agriculture. Follow its history from its birth down to this day and note its achievements. It is a striking example of what you can do by thorough organization. Then, again, I would call your attention to the fact that in these organizations they ought not to cover too wide a territory; they should be local, to start with. We are reading much in these days, and hearing more, about community centers and community interests.

Well, that is only another form of organization. Now that organization may take whatever form you are pleased to follow. It may be the grange, it may be the farmers' club or the farmers' union, or it may be just a little handful of farmers; but remember that the first thing you must do is to *organize*. That is the thought that I want to leave with you and I want to pound it in so hard that you will not forget it. Why, some years ago when P. T. Barnum was at his desk, as the people came out of that tent one afternoon at the close of one of his afternoon performances, they came along the side of a smaller tent and there they saw and heard one of those barkers, as they were called and he was proclaiming, in a loud tone of voice, that for a dime, ten cents, a tenth part of a dollar, they could go inside and see what no man, woman or child had ever seen before. They quickly parted with their dimes and went in and the tent was finally filled to overflowing and then they commenced to come out and they called that man an imposter. Why, they said "There is nothing in that tent." He said, "Wait a minute." He went inside and hauled back a curtain and there, sitting on a plank, were six farmers and they had hold of a rope and they were all pulling together, the other end being fastened to the center pole of the tent. He said, "There, ladies and gentlemen, is something that no man, woman or child ever saw before, six farmers pulling together." (Applause and laughter). Now that is the keynote of marketing, pulling together. I would like to see this State Board pull together as a unit in the great work of uplifting agriculture.

EDUCATION

Now the second point I want to make is that of education, and I shall not refer to the kind that you would ordinarily expect to get in college, but rather that which you would get from the University of hard-knocks. That is the kind of education that most of us have and that is the kind of education that sticks, and I want to say to you that the very best education a man, woman or child can get is that

which teaches him or her how to work. Why, someone has said, "God help the rich, the poor can work;" and I believe that this is the real salvation of this country today that so many of us know how to work, and the best thing that could happen to agriculture today would be to have more young men and more young women on the farm who know how to work.

Now the education that I refer to today is that which acquaints the farmer with the needs of the market. I discovered yesterday, by listening to the remarks that were made here, that even though some of you have been engaged in a certain line of agriculture for a number of months, that you have not yet learned the needs of the market and that the great question, one which requires considerable education, and you know the allegation is often made, and I resent it with all my heart and all my soul, the allegation is often made that the farmer is not a business man. I want to say to you that you may go where you will over Pennsylvania or throughout the length and breadth of this country, and you will find that the best and the brainiest men are men from the farm. Go into the great banking institutions of Philadelphia or New York and you will find that 90% of them were men from the farm. They are business men, but unfortunately many of them do not have time to study the science of selling their products, and that is where a great many of them fail, they do not understand how to get their product to the market in the best form and at the least expense, and I believe that the Department of Agriculture could do no greater service to you farmers and to agriculture in general today than to give the farmer some assistance along the line of grading, packing and salting.

Just let me relate one or two experiences I have had which cover this point: I think it was two years ago, nearly two years ago, that I was in one of the western counties of Pennsylvania where they ship a great deal of hay, and those farmers thought they were not getting enough for that hay. Well, I said, "Do you want to ship it direct to the market?" And they said, "Yes." I said, "All right, I'll tell you where to ship it;" and then I said to them: "Now you have several grades of hay, and not many of you have had any experience in the grading of that hay, but so far as you can, order two or three cars, and then when you farmers take that hay to the market or to the station, sort it as nearly as your knowledge will permit, putting only one grade in a car;" and those farmers followed out the instructions given them, and they told me afterward that they received \$7. more a ton for that hay than they could have gotten at home. Just last week, at the close of the Institute in Mercer county, a young man came to me at the close of the Institute and said, "Do you remember telling me about shipping some hay?" I said, "Yes, sir." "Well," he said, "I saved \$7. on a single car." Now that is the kind of marketing that touches the farmers' heart. Why, do you know someone has said that "he who makes two blades of grass where but one grew before is a benefactor to mankind." I want to say to you that he who can bring two smiles where none grew before is a greater benefactor, and there is nothing that will make a farmer smile more widely than to give him a good price for what he produces, and he is not so much concerned today about the production of that extra blade of grass as he is as to who will get it after it is produced. That is the big problem in this business.

Now another illustration to show you what I mean; some of you are engaged in the growing of potatoes; I know there are some here from counties that produce many thousand of bushels, and the one thing that has kept you out of the best markets has been the fact that the potatoes often have not been thoroughly graded. The potatoes as they usually come from the ground ought to be graded into three grades, and yet the common practice is, with many farmers, to simply sort out the little ones as they are called, and then put them all in one grade; yet I know of instances over in New York City, where they are paying 10 and 15 cents more a bushel for potatoes of a certain grade than they are paying where they are shipped practically as they come from the ground.

The question of fruit marketing was touched upon here yesterday. Why, farmers, do you know that it costs 55 cents a bushel to get the apples of the West to our market? Now is it possible that you let some fellow way out on the western coast pay that additional charge and compete with you? You know and I know that you can grow the finest apples in the world right here in Pennsylvania, and what is the difference? Why, just let me call your attention to this; when a man orders a box or 50 boxes or 100 boxes of Spitzenburg apples from the West, he knows that every box will be like the other box; he does not buy them by inspection, but he buys by reputation; but you let some one come into the market where many of our apples are sold and instead of taking your word or the word of the dealer they must see them; and that is not all, they must handle them, and many times handle them until they are bruised and unfit for the market, and that is the method that is being employed in too many instances here in Pennsylvania. Now then we need to have, as has been suggested, and here again comes in your organization—I would like to see all the different horticultural societies of Pennsylvania just tied up in one organization, have one trade mark and one stamp, and when they put on a barrel or a box of apples, it means something, just the same as it does when they come from the west. Why, we farmers have as many brands, as the western farmers have, and why can't we use them? And I believe that the time is coming when we will use them.

Another thing—I call your attention to along this line of education is the fact that oftentimes we don't know when and where to ship. That is a serious obstacle, and here again I believe that the Department of Agriculture can be of great assistance to us in this work. We should have on file at the Department at all times information that will enable you farmers to know where and when to ship. Why, you know it is a crime to ship products to one market until it is glutted to that extent that they must take the apples or the potatoes or the tomatoes or whatever it may be, out and dump them into the river or the ocean. That condition ought not to obtain, and if we had adequate marketing facilities and the right kind of information, it would not obtain. There is just as much in knowing where and when to ship as there is in producing the crop. We hear much about supply and demand and undoubtedly that affects market prices, but our marketing has been dump and demand, and I want to stop it. Why, the farmers today are planting and sowing by faith, and they reap in hope and they market by accident; and they have been doing that right along, and now let us see if we cannot adopt a better method, let us see if we cannot, by working together, work out a problem that will give to each man an honest share of what the harvest

yields. I am a firm believer in giving the producer of any commodity an honest price for what he produces. I think if there is anybody that ought to have the profit, it is the man who produces it and not the man who hands it over to somebody else; all toil, if it is honorable, should bring some recompense, and if we need assistance in this work and men to give valuable aid, then they are entitled, then they are entitled to some pay, but we can work out a system whereby we can eliminate a lot of unnecessary so-called middle men.

Now a great deal has been said about the middlemen and I am not here this afternoon to make any cry against them. I want to say that the system is wrong and not the men, and what we need is a different system of marketing, and when we have that, we will not need to worry about the middleman, he will be taken care of all right, and with a system along the line that I have suggested, I am sure that we will help solve this problem.

One other thought comes to me, to show you the need of having this information; I think it was two years ago last August that I was in York county in a community where they raised a great many potatoes, and, as I remarked, it was about the third of August. I was at a little railroad station, I have forgotten the name of it, the farmers were loading potatoes and I went out into the car where they were loading them and asked one of the men what he was getting for his potatoes, and he told me 50 cents a bushel, and I said "Where are you shipping them?" And he said "To Baltimore." Well, I said "You will excuse me, but could you not find a better market than Baltimore at this time of the year?" "Well," he said, "Why?" "Why," I said, "Don't you know that they have potatoes in Baltimore weeks ago and they have plenty of them today? Why not ship these potatoes north where they haven't yet come into the market? When I left my home yesterday morning, potatoes not as good as these were bringing \$1.25 a bushel." Now, do you catch the thought? Instead of shipping those potatoes south, they should have shipped them north. What would have been the result? Why, the farmers of York county would have gotten more for their products and the consumer at the other end of the line would have paid less, and that is true co-operation. That is the kind of co-operation that you and I ought to be most vitally interested in, that which helps us all, and I would have you remember, farmers, that when you reach out your hand and help your brother, you are bound to help yourself.

CO-OPERATION

The last point that I would touch upon is that of co-operation and, lest some fellow might misunderstand me, I want to give you a definition of co-operation, "Do unto others as you would be done by." Now I think that most of you can tell where that is found. If you cannot, I hope you will hunt it up, but I believe the one thing that has kept farmers from co-operating has been the fact that they have not been willing to follow out that law. When we reach the point where we are willing that the other fellow shall get his share, then we are in a position to do some thorough co-operation.

Now, in conclusion, I would like to urge you farmers, when you go back home, and the members of this Board and the Institute workers, to think over this problem and, having thought over it, if you have any thoughts along the line of helpfulness, I wish you would take the

Secretary at his word yesterday and either see him personally or write him what your thoughts are. This is a work in which we can all help and one in which we are all vitally interested. Let us see if we cannot, during the next two years or during the next year, work out a system of marketing such as no state in the Union has ever seen. I believe we can do it. I believe that with the experience that we have gained along this line, we can make it possible for farmers to not only produce more but get more for what they produce.

I was interested while up in Mercer county to find that the National Government, under the auspices of the Department of Agriculture, was giving the farmers there an interesting lesson in what can be done by way of selling the dairy products. They have leased there a creamery, I believe for 15 years, and the manager of that creamery came before one of our Institutes and gave us a summary of the first year's work, and he showed us that the Government, by running that creamery, was giving the farmer a much better price for the milk from his herds than he had ever received before, and that the creamery cut down the expense and by doing that we are going to solve this great problem. If I had time, but I will not take more of it, I would like to talk to you more about what has been done in co-operating here in Pennsylvania. I could tell you of some things where the farmers—of some instances where the farmers have not only saved money, but they have learned the lesson of putting their products on the market in a form that makes them attractive, and that, I believe, is the solution to the problem of the high cost of living. Now let us go back to our several homes and take up this along with other problems and study them from the standpoint of our interest, and if we do that we will take into consideration all other interests because all interests are dependent upon agriculture and the farmers' success. I thank you for your attention. (Applause).

The CHAIRMAN: I am sure we all feel very grateful to Mr. Dorsett for giving us this splendid address, and on behalf of the Board I wish to thank him. We have with us Secretary Patton and I am sure you would like to hear from the Secretary. He has a few words before we adjourn. (Applause).

SECRETARY PATTON: I think you are nearly all ready to go home. It has been warm and close in here and you have been listening to speeches now for two days. I haven't much to give you; I will try and be in shape next year, when I have had the experience of the office. You must understand I have only been here for three months. A great deal of the work is new to me and I had to get acquainted with it. While I know a good bit about the practical side of farming, there are some parts of it I don't know, and especially the running of the Department of Agriculture. I am the Executive and look after the business end of it. We are supposed to take care of the scientific side of it through our Advisers and our Institute Lecturers and scientific men that we employ in the Department. I have been making some changes in the organization, changing the bureaus around a little and trying to get them into a more business-like shape. I think if you will visit the Department, you will find that we have made some very good changes. Of course, under the new law, the Secretary has more power than he had under the old law. Under the new law all the bureaus come directly under the Secretary; he has absolute control.

I am glad that I have had this opportunity of meeting you all and trying to get acquainted. It is pretty hard to get acquainted with 80 or 90 men here in two days, but I have enjoyed meeting you and I want you to feel at perfect liberty to come to me at any time. If you are in the city, come up to the Department and you will find me there most of the time, as I expect to be on the job. (Applause).

MR. WEIMER: Mr. Chairman, I believe this morning I was granted leave to prepare, in writing, a resolution which I offered. Our friend Mr. Dorsett likened this body to a bone between two fighting dogs; that means then that the bone is no dog's bone. That is a very good condition, a condition we find ourselves in today. But how about the winning dog? What does he do with the bone? Probably takes a few gnaws at it and buries it for future use and forgets all about it, and that is the condition probably we may find ourselves in, and that prompts this resolution:

Whereas, There was created, in 1851, a State Agricultural Society which was later changed in name to the State Board of Agriculture, which, by law, was to act as a body to govern and direct the agriculture work of the State in and through a Department of Agriculture, and

Whereas, There was created by the last Legislature, an act creating a State Agricultural Commission to act as a directing body of the Department of Agriculture, through the Secretary of Agriculture, and

Whereas, The duties of these two bodies are in conflict, and as the Act of 1851 and amendments thereto were not specifically repealed by this Act of 1915, and, therefore, one of these bodies is now unconstitutional or without legal standing;

Be it Resolved, That this question be referred to the Attorney-General and to the Economy and Efficiency Commission, with the request that they report to the Executive Committee of our body as to the legal standing and duties of each body, and such report be published in the 1916 report of the proceedings of this State Board of Agriculture.

Gentlemen, I think we ought to know where we stand. I make that as a motion.

Motion seconded.

MR. JOEL A. HERR: I would like to make a statement that the law of 1851 was not the one that created the Department of the State Board of Agriculture; that was done in 1876.

MR. WEIMER: I said "Whereas, there was created in 1851, a State Agricultural Society which was later changed in name to the State Board of Agriculture." Those were the steps of the law. I have looked that up very carefully.

MR. JOEL A. HERR: I think that statement is correct.

MR. WEIMER: It is, because the Act of 1851 makes it possible for every man here today to be here.

MR. HUTCHISON: I have not given this matter very much thought. I wish this had been brought up when we had a full Board meeting. As long as there is no question, the question hasn't arisen

yet to test any of our rights or privileges or what brought us into existence, there is no confliction with our duties, why are we seeking trouble? Why are we seeking to find out about ourselves? What is the demand on us? That is my thought. There was a resolution here this morning when I came in on some similar subject. Now this should have been brought up when each county was represented. The idea of us referring it to the Attorney-General and the Efficiency Commission.

Another thought, I'd have to study over that and find out if that is the proper place for us to take up this trouble? We don't seek any trouble. The Legislature passed the appropriation and paid for us to go on and attend to our duties, and the Secretary of Agriculture, through the Deputy, started us out on the Institute work, and why we should be seeking this, is something I cannot understand. I cannot get it clear in my head why we should raise the question when the public is not and nobody else is, and why we should be bothering about it. Let it come when the time comes, and if we are to be retired, we will accept it like men. But my thought is don't let us be bringing the question up and hashing it up and fussing about it at all. We are doing our work and have had a splendid meeting, and now why do we want to ask the question whether we are or not? I can't understand it. I don't see what it is and don't know what motive there could be that we should raise a question of this kind when not more than two-thirds of the counties here are represented. I move that this be laid on the table.

Motion seconded.

MR. WEIMER: I beg to take exception to Mr. Hutchison's remarks. This resolution was presented when the full board was present and I was given permission to take time to write it out and I want you to think thoroughly about this matter, gentlemen, you may be misled, but you are going to be put out of existence.

MR. HUTCHISON: When that time comes, we'll die.

MR. WEIMER: Let us know before hand. My motion has been seconded, and I would like to have it put to a vote, because I think it means our life or death.

Mr. BOWN: If I understand the motion made this forenoon and to be brought up this afternoon, this is an altogether different motion.

The CHAIRMAN: We cannot compare that for the simple reason it was not presented in writing this morning.

MR. FENSTERMACHER: If I am in order, I would like to call on the Nestor of the Board of Agriculture, Joel A. Herr. I would like to have a short summary of the history of this Board. I call on Mr. Herr. If any man can pour oil on the troubled waters, he can.

MR. JOEL A. HERR: I am not loaded for that kind of game, to undertake now, without warning, to give you a history of the Board of Agriculture. I could not do it and give you a thorough and fair report. But I want to state that the man who offered the bill in the Legislature of 1876 was Dr. John P. Edge, of Downingtown, Chester county, and the bill was passed that year and the Board was organized in 1877, and I did not know that it was the result of any

former organization or that it was changed from any former organization, but the Board started in 1877 with Secretary Edge as the secretary and I don't know that there are any other members of the Board today who were members of the Board at that time.

I came to the Board of Agriculture in 1879, at its Philadelphia meeting. I have attended most of the meetings since. The Board of Agriculture has been the backbone of agriculture of the State of Pennsylvania. The members were sought for any information from their respective counties, and they reported here, they were a strong body of men. The work of agriculture in this State was carried on from that day to the time of the organization of the Department of Agriculture at a very low expense, comparatively. The Department of Agriculture was created under the pretense and under the assertion that the Board of Agriculture, being a large body of people, was very expensive and it ought to be cut down to make it more inexpensive. Well, they created the Department, but the first thing they did, instead of cutting down, was to build up the salaries; they were nearly doubled, and it has been continued from that day to this, more or less. The most important thing, I think, they have done, is to raise the salaries. (Laughter) But without criticising the Department of Agriculture—I have no fault to find with it, I am not here to criticize the Department of Agriculture. If they get more than they earn, perhaps they get it legally and rightfully, but I do want to say that this Board of Agriculture has stood behind all the troubles of the Department of Agriculture. It stood back of them all and it stood behind the State College. It exercised its very best efforts to promote the interests of the State College, and why the State College should have any variance with the Board of Agriculture, I cannot conceive unless they are ashamed that we don't get salaries. (Applause and laughter.) There might be something in that. I am sure that we have given the State a service of charity; we have spent hundreds of dollars every year for which we received nothing but the information that comes through the work of the Board of Agriculture.

Now I don't want to go into an extensive criticism of the Department of Agriculture nor of the Board. I desire that we work together. I think, today, if this Board of Agriculture were abolished, the Department of Agriculture would have a whole lot of trouble on their hands that they don't realize now in conducting the farmers' institutes in such an inexpensive manner as it is at present conducted, where not a member of the Board gets a dollar for his expenses, for his services in carrying on all the institutes throughout the State. I think this Board has been a self-sacrificing Board, have spent time and money. I think I have spent years of service for which I received no compensation but the pleasure and instruction that I got in these meetings. Now, is there anything that you want to ask me? I don't know what you want of me at all.

MR. WEIMER: I would like to ask Mr. Herr, right on the bottom of page 4, you will see the Act of 1851 and 1876. If you will go to the library next door you will get a copy of that law and see that what I tell you is true, and if the Act of 1915, just passed, is construed in one way or another, it means that this body meeting here today is not in existence. I understand that a good many of these

men here have their expenses paid; I understand that a good many of these men represent societies that get \$100 from the County Commissioners. If we are not a legal body, we don't want to get that money and I think it is proper to get that information from the Attorney-General.

MR. HUTCHISON: The question is on laying this resolution on the table.

MR. WEIMER: The question is on the resolution.

The **CHAIRMAN:** The Chair rules that the motion to lay the resolution on the table is in order. We are voting on Mr. Hutchison's motion to lay Mr. Weimer's resolution on the table.

The motion to lay the resolution on the table was then put and adopted.

The **CHAIRMAN:** Is the Legislative Committee ready to report? Have we any report from the Legislative Committee?

Mr. Lohr then submitted the report of the Legislative Committee as follows:

REPORT OF LEGISLATIVE COMMITTEE

We, the Legislative Committee of the State Board of Agriculture, beg leave to submit the following report:

We are pleased to report that since our last meeting, the following measures which we then recommended have been enacted into law, namely:

1. An Act to regulate the sale for agricultural purposes of crushed limestone, lime, etc.

2. An Act to amend an act, approved the twenty-fourth day of July, one thousand nine hundred thirteen, entitled "An Act defining commodities," etc.

3. An Act to regulate the sale of certain seeds, etc."

In addition to this, we are glad to announce that further measures, beneficial to the cause of agriculture, have also been enacted into law:

1. An Act establishing a State Commission of Agriculture; defining its powers and duties, etc.

2. An Act for the encouragement of agriculture and the holding of agricultural exhibitions, etc.

3. An Act to prevent deception in the sale of paint, putty, turpentine, or any substitute therefor, etc.

4. An Act amending an act, entitled, "An act, supplementary to 'An Act for the taxation of dogs and the protection of sheep,' approved the twenty-fifth day of May, Anno Domini one thousand eight hundred and ninety-three; requiring all dogs to wear a collar," etc.

5. An act for the protection of sheep, and the incidental destruction of certain dogs.

Your Committee would further recommend the following:

First: That the standard of purity of the following seeds, namely, medium red clover, mammoth red clover, crimson clover, alfalfa, timothy, be raised by legislative enactment from 97 per cent. pure, as the present law provides, to 99 per cent. pure.

Second: We recommend that the present law regulating and controlling the sale of fertilizers be so amended as to provide that the amount paid by the manufacturer to the State for the registration of the various brands will be on the tonnage basis instead of a fixed or fee basis per brand as the present law provides.

We also recommend that the above named Act be so amended as to provide that the manufacturer of commercial fertilizer containing nitrogen, shall stamp upon the bag or container of such commercial fertilizer whether the said nitrogen is obtained from mineral or organic matter.

We believe that a more stringent law should be enacted for the control of noxious weeds.

Respectfully submitted:

H. G. MCGOWAN,
ROBERT W. LOHR,
S. S. BLYHOLDER,
P. S. FENSTERMACHER,
MATTHEW RODGERS,
Committee.

MR. LOHR: Now, along this line gentlemen, I want to make a few remarks. Of course you are aware of the fact that we will meet again before any legislation is enacted; that is, before any material legislation is enacted. When we meet here next year, if we meet, the Legislature will be in session so that we have time, up to that time, to receive suggestions and to find out what is really desired along the line of changed laws beneficial to agriculture. But I want to leave this one thought with you here, that it is not only necessary for you people to come up here and give your suggestions, it is not only necessary for us to come here and make these recommendations, but if we want a law, we must push the bill from the time it is introduced in the House and Senate until it has the signature of the Governor.

There is where we are a little lax in seeking legislation, we forget where the bill is, it is allowed to stay in Committee and is killed and we know nothing about it. If the manufacturers or railroads want a law passed through the Legislature, they follow it up and always know where it is and have someone looking after it. The agricultural people pass a resolution or assemble in a farmer's institute and then go home and forget all about it. The result is that the bill is introduced in the Legislature, lies around in Committee for two or three months, passes the House, goes over into the Senate Committee and lies there for two or three months and the Senate adjourns and you hear no more of your bill. So it is your business, if you expect a bill to pass the Legislature, to give it your active support from the time you first advocate it until it has the signature of the Governor—your active support, and by that I mean get in touch with your members of the Legislature from your county, get in touch with them and show them why you want it passed, show them that you are interested in the passage of that particular measure and in that way we can obtain legislation along these lines, but we have just been a little too negligent, there has not been enough push and probably the chief reason for all this has been the lack of organization among the farmers. (Applause).

MR. MCGOWAN: I would like to second all that my friend Mr. Lohr has said relative to the assistance that this Legislative Committee should have and the co-operation of every member of the State Board of Agriculture along this line. I passed through two sessions of the Legislature, and Mr. Lohr speaks advisedly and knows how much every member appreciates the co-operation and assistance of his friends at home or anywhere throughout the State in his endeavors to press any bill so that it may reach the Governor and receive his signature and become a law. Mr. Lohr has said you are interested here, but when you get to your various homes, you forget about the Legislative Committee and you forget even your own interests. Now we all agree that we ought to have a more stringent law against noxious weeds. Mr. Herr, from Lancaster, referred to this yesterday. Our farms are becoming saturated with these weeds. I remember when I was a boy my father would send me a quarter of a mile to pull a carrot out of the field, so watchful was he. Where are we today? Our fields and by-ways are simply saturated like a flower bed with wild carrots and various other noxious weeds. In our county, as an illustration, there is the owner of two farms and upon these two farms weeds have multiplied until they are a general nuisance. In Penn township, of my county, the Farm Bureau took this matter up and by reference to the statute books found that it was powerless or they were powerless, this Committee, to do anything in the matter to obliterate this nuisance. Now then, we did have a bill before the last Legislature enumerating just such weeds as grew upon these two farms and we would have had plenty of redress had this bill become a law. It fell by the wayside just for want of proper support from the farmers of our State.

Further, we had a most excellent fertilizer bill and it just reached the point, where, if it just had a little push to push it over the high pinnacle, it would have been a splendid law, governing the tonnage tax upon fertilizers, which I believe is absolutely necessary, as well as containing other provisions beneficial to the farmers. That bill passed through the House all right, but when it reached the Senate, the big fertilizer manufacturers jumped on it. The consequence was they were in the majority and the farmers, as usual, were in the minority. Now I simply want to ask your co-operation, and when you see that there is any matter that is beneficial to the farmers of the Commonwealth, or their interests, get in touch with the Legislative Committee, or if not, with the members of the Legislature from the various sections of the State.

MR. J. ALDUS HERR: I would like to say a word with reference to what I mentioned yesterday. Would it be asking too much to have a law passed to eliminate certain obnoxious seed from grass seed? You heard the expression used yesterday, and we especially in Lancaster county, in a limestone soil are getting thoroughly polluted with Canada thistle. I recollect the time when there wasn't a Canada thistle stalk in the neighborhood for 20 or 25 years, and now I doubt if there are any farms that haven't a few of them. We get rid of them as soon as we find one, but as fast as we get rid of one, another takes its place. Why couldn't we have a law eliminating Canada thistle and some other obnoxious weeds entirely? Why must

we have it at all? For the life of me, I cannot see why. I would like to hear other views on that; it is a pretty serious question with us.

MR. GEORGE: I do not know whether I am in order or not on the subject before the house, but the discussion seems to have drifted on to the weed question. Yesterday, when that subject was up, I would liked to have said a word or two, but the time was short. You know the Government is very generous and has been for some years in sending out packages of seeds and different kinds of grain. Last year the Congressman from our district wrote me that he had several packages of alfalfa, Canadian alfalfa, and some soy beans, and wanted me to send him the names of persons to whom he could send those packages. I did so and used some of those soy beans myself. When they grew up I found a weed among those seeds that came from the Government. I don't know whether it was a bad weed or a good one. I took a sample of the blossom, of the leaf, and sent it to Prof. Menges. I never heard from him. He apologized to me yesterday when I met him and said that he was away from home when my samples reached him and he did not get there for some two weeks afterwards and the sample was so badly wilted then that he did not know and could not tell what it was. So even the Government are sending out weeds along with the seeds that they send out.

Another point I have in view, not only the grass seed but the grain seeds. Last year, last spring, about seeding time, our farmers were not quite satisfied with the oats that they had and they thought they would like to have a little better grade of oats to sow and there were two or three carloads of oats brought into that neighborhood and the farmers bought them very readily, and you never saw such a dose of soot as our farmers in Indiana county and the adjoining county, Armstrong, right around our neighborhood got this last year, but they did not yield much more than half a crop and it was almost impossible to thresh them, a man could not stay in the barn, they had o their blowers and threshers outside. These are a few of the things I wish to state, but as time is getting short, I will not take any longer.

The **CHAIRMAN:** Now, gentlemen, we have this report of the Legislative Committee before us; what is your wish in regard to it?

MR. HUTCHISON: I move its adoption.

The motion was seconded and carried.

MR. HILL: I have a resolution which I would like to present at this time. Yesterday, his Excellency, the Governor, while paying us a visit, referred to the tour that was made last season, especially for the purpose of seeing the State highways throughout Pennsylvania, and expressed an intention to repeat that tour this season, but specially for the purpose of seeing the growing crops and the condition of the farms, etc., in the State, and the Secretary of Agriculture expressed a desire that we might suggest a time for the trip and intimated that possibly it might require three weeks. I have made provision for four weeks in this, so as to give them some range of choice, and these dates are subject to change, if not acceptable.

Mr. Hill then presented the following resolution:

WHEREAS, His Excellency, Governor M. G. Brumbaugh, has expressed an intention to organize an automobile tour over Pennsylvania, and, whereas, the Secretary of Agriculture, the Hon. Charles E. Patton, desires to have this tour made of the highest possible value to agriculture in Pennsylvania, therefore be it

Resolved, That we suggest the tour to be made between August 15 and September 15, 1916, and that the party be and they are hereby invited and urged to visit as many Pennsylvania farms as possible in all sections of the State, and that the members of this Board cooperate with the Secretary of Agriculture in the making of arrangements for the party in the respective counties.

MR. HILL: I move the adoption of the resolution.

Motion seconded.

MR. HUTCHISON: I am in favor of this resolution; but is it not a little late in the year? The crops will all be gathered, that is, the wheat crop and hay; in September it will be all bare fields. Now, for the horticulturist, it is a fine time and is just in seeding time, just after seeding time in most of the states. Wouldn't it be better—

MR. HILL: As far as the view is concerned, it would be nicer in May, but then you wouldn't get the benefit of the fruit and corn in May.

MR. HUTCHISON: You would get the corn all right. I haven't thought enough on it to intelligently interpret it, but we are getting into the frost section, and cold.

SECRETARY PATTON: In our northern counties and our western mountainous counties, we will have frost; I think, from the 15th of August to the 15th of September would be a good time.

MR. HILL: I will change it from August 15 to September 15th.

A Member: I would suggest that if this party come to the Adams County Fruit Belt, they came from the 15th of September to the first of October. After October, the fruit is being gathered. The 15th of September to the first of October will be the best time to see the Adams county fruit, if we have any.

The **CHAIRMAN:** We have this resolution before us. What is your wish? It has been moved and seconded that this resolution be adopted.

MR. DE WITT: What is the date now?

The **CHAIRMAN:** August 15th to September 15th.

MR. De WITT: There has been nothing in this institute that interested me so much as this trip that I hope the Governor and his staff will make; but the western end of the State, up through Tioga county and up there will be very much nicer sometime between August 15, and September 1st; I have lived there 60 years; but come.

SECRETARY PATTON: We can arrange that by going into those districts early and taking the southeastern part of the State and down through the southern part of the State later, and fix that up that way.

MR. DE WITT: That's good; we want you to come.

The resolution was then adopted.

The **CHAIRMAN:** Is the Memorial Committee ready to report? Mr. Rodgers then presented the following report:

REPORT OF MEMORIAL COMMITTEE

Your Committee on Memorials beg leave to report as follows:

M. M. NAGINEY

Sadness fell upon the members of this State Board of Agriculture when the news came to us of the death of our friend and member of this Board, Morris Mitchell Naginey, whose death occurred in the German Hospital, Philadelphia, Pa., on March 25, 1915, where he had been confined for five weeks having undergone an operation. The operation was pronounced successful, but blood poison developed, causing death.

The deceased was born near his Milroy home sixty-two years ago. A few weeks before his death he had received the appointment of Postmaster at Milroy, Pa. For many years he was a member of this Board and was a member of the Executive Committee at the time of his death. He was the Chairman and Manager of the Farmers' Institutes that made them a success in Mifflin county. He was President of the Horticultural and Agricultural Association of his county and identified with other movements for the promotion of farming interests in his section. He is survived by his wife and four daughters.

This is but a brief tribute to our brother and friend. We have known him for so many years as a member of this Board. He was a man of strength intellectually, yet he rather shrank from public position than sought it. He enjoyed being a member of this Board. The most outstanding thing about him to us was his faith in God. "Blessed is the man whose strength is in Thee, and whose heart is in the highways of Zion." He estimated things in their relation to God's will and tried to live as in His presence.

We, the Committee and Members of this Board, extend to the family our heartfelt sympathy, and ask that the report be spread upon the minutes and a copy be sent to the family.

HON. HENRY C. SNAVELY.

It is with deep sorrow and profound regret that we have lately learned that God in his wise providence did by death call our brother and co-laborer, the Hon. Henry C. Snavely, member of the State Board of Agriculture, he representing the county of Lebanon for the last twenty years on this Board, to his eternal home, his death having occurred November 21, 1915; aged seventy-one years and seven days.

Mr. Snavely was a descendant of Casper Snavely who came to America from Switzerland in the year 1735 and settled in Eastern

Pennsylvania. The Snavelys bought a very large tract of land near what is now the city of Lebanon. Our honored friend owned a farm on part of said tract where he lived and died.

Mr. Snavely was educated at his home school, Annville Academy and Eastman Business College, Poughkeepsie, N. Y.; taught school for three years and then settled down to farming and fruit growing. In this calling he made an entire success and became the greatest fruit grower in Lebanon county. He was influential in organizing the first subordinate Grange in the county, of which he was a life-long member. He was a member, both of the State and National Farmers' Alliance, President of the former and Vice-President of the latter; a member of the State Horticultural Society, of which he was President three years and for many years Chairman of its Fruit Committee. He represented his county in the Legislature at Harrisburg in the years of 1911 and 1913, with marked ability, giving special attention to the agricultural interest of the State and to the welfare of the tillers of the soil.

In the twenty years of Mr. Snavely's service with the State Board of Agriculture, he has filled about all the different offices on said Board. While he was not a man known for his much speaking, yet he was one of the best of all-round men we ever knew—sweet spirited, strong in character, wise in council and highly intelligent. He will be sorely missed on this State Board of Agriculture. While we mourn his death, let us bow with humble submission to the will of Him who makes no errors but "doeth all things well." "Mark thou the perfect man, behold the man of upright ways; Because the man of holy life, in peace shall end his days."

Resolved, That this report be spread upon the minutes and a copy sent to the family of the deceased.

PROF. SAMUEL B. HEIGES

Prof. Heiges, in the early days of the Board of Agriculture and of the Farmers' Institute work, was one of the prominent and forceful educators of the times, having travelled over almost the entire State and in several other states, in institute work. He was an educated and cultured scientist full of practical thought and information—always ready to work in any direction which his varied attainments invited. During President Cleveland's administration he was made Pomologist of the National Department of Agriculture—of recent years his services were largely employed in Virginia agriculture. He recently expired in his York home and was respected and honored by all who knew him.

THOMAS J. EDGE.

The announcement of the death of Hon. Thos. J. Edge which came to most of the members of this Board through the public press, was a surprise to the many men of the State who for years were co-laborers with him for the advancement of the agricultural interests of our beloved Commonwealth. Although he had passed the "three score and ten" years allotted to men and was known to be suffering some of the infirmities common to men of advanced age, his calling from labor to reward was so sudden as to be almost incredible; and even now after the lapse of six months it is hard to realize that he

has stepped from the stage of activity and forever passed from the busy scenes of the useful life, in which he was so helpful to the generation to which he belonged.

Mr. Edge was born at Midway, Chester county, Pennsylvania, August 13, 1838. He was educated in the private schools maintained by the Society of Friends, to which Communion his family belonged, the Westtown Boarding School and the Select School maintained in Philadelphia by the same Communion. Before reaching the period of mature manhood, he moved with his father's family to a farm in New Garden township, Chester county, Pennsylvania, where his natural love for agriculture and agricultural pursuits was so developed as to turn his attention to the farm industry as his life work and led to his final ownership of the same farm. Here he remained an active and successful farmer until, in February, 1877, he was called by a unanimous vote of the State Board of Agriculture to the position of its first Secretary, in which place he was continued by re-election until, in 1895, he was appointed by the late Governor Daniel Hastings the first Secretary of Agriculture of the State.

During his period of service as Secretary of Agriculture he continued to hold the office of Secretary of this Board, as provided in the Act creating the Department, making his term of service as Secretary of this Board twenty-two successive years.

When appointed Secretary of Agriculture, his first duty was the organization of the new Department which important work was so well accomplished as to secure the approval of the Chief Executive and meet the favor of the friends of agriculture throughout the State.

It is impossible for your Committee, in the brief space that can be allotted to this report, to direct attention to all the good that has come to the people of our beloved State from the continued activity of our departed co-laborer and friend. Among the many, we can not, even though space is limited, overlook a few of the helpful things he promoted and aided in accomplishing while officially connected with the agricultural interests of the State.

During the first year of his service as Secretary of this Board, he turned his thought to the importance of conserving the forests of the State, not only on account of their value to agriculture through the influence they have upon climatic conditions, but on account of the commercial and economic value of the timber producing interests to the State and nation. The interest he showed in this matter was continued, and as a means of extending it throughout the State, he secured the attendance, at meetings of the Board, of persons who, in papers read and addresses delivered, were able, as experts, to show the great importance of taking proper care of forest lands still existing, and replanting such as were already devastated. This was earnestly and consistently kept up, until a Forestry Commission was created by an Act passed by the General Assembly during the session of 1883, the usefulness of which has been extended by the subsequent establishment of a Department of Forestry.

Among the many important interests that received Mr. Edge's attention and were thereby promoted, in the earlier years of his service as Secretary of the Board were, the Act to regulate the manufacture and sale of Commercial Fertilizers, so as to insure to farmers a fair return for the money expended for the same, which he prepared and submitted to the Board for its approval in 1877, and which became a law in 1879; the Oleomargarine legislation, the

first bill of which he at an early date in the period of his service laid before the Board for approval and which was the forerunner of all the legislation since passed, so important to the dairy interests of the Commonwealth; and the Act of June 2, 1887, establishing Farmers' Institutes and making appropriations for same. Added to his work in securing the passage of the last Act named, was the important service to the State, of so completely organizing this work as to start it on a continued mission of usefulness that can not be over-estimated.

But the grim reaper Death is no respecter of person. This man of honor, integrity and usefulness has gone from among us and it is indeed a sorrowful task for your Committee to give expression to their feelings and the feelings of this body upon the death of one with whom we were so long associated as members of this Board, and the quotation, "that death loves a shining mark," was more than ever impressed upon us when we heard of his death. His remarkable intelligence, uniform kindness and unabated labor for the building up of all agricultural interests in the great State of Pennsylvania will always be held as precious memories. He was widely known throughout the State as a man of extensive knowledge, quick perception, affable, courteous and possessed of a high sense of honor and executive ability, all of which united to make him a highly capable official.

He was a man devoted to duty, and in every sense a Christian, a man blameless among his fellows, and in short, one of nature's noblemen. He was an ideal citizen and those who knew him best loved him most. The family is bereaved of a devoted husband and father, and the members of this Board have lost a friend in whom faith and interest were unbounded.

Therefore, resolved, That we the State Board of Agriculture of Pennsylvania, with a deep sense of the loss we ourselves sustain, tender to the bereaved family our heartfelt sympathy in their severe trial, and recommend that this report be spread upon the minutes of the Board and a copy sent to the family of the deceased.

MATTHEW RODGERS,
JOEL A. HERR,
S. S. BLYHOLDER.

Committee.

(Revised by resolution at Reading meeting).

HENRY W. NORTHUP.

Henry W. Northup died July 30, 1915, at his home in Glenburn, Pa., after twenty minutes illness, aged seventy-nine years.

Therefore be it resolved by the State Board of Agriculture of Pennsylvania, of which our lamented friend was a member for many years, that while we bow with humble submission to the will of the Supreme Being, we do not the less mourn for our neighbor and member who has been called from his work to his final rest.

Resolved, That in the death of Henry W. Northup, this Association loses a member who was always active and zealous in his work; prompt to advance the interests of our Association, devoted to its welfare, one who was wise in council, an honest and upright man, whose virtues endeared him to all his fellow-citizens.

Resolved, That the members of this Association tender their heartfelt sympathy to the family and relatives of our deceased member in this their sad affliction.

MATTHEW RODGERS.
JOEL A. HERR,
S. S. BLYHOLDER.

Committee.

The CHAIRMAN: Gentlemen, you have this report of the Memorial Committee; what is your wish?

MR. BRAUN: I move its adoption as a whole.

Motion seconded.

MR. JOEL A. HERR: May I ask that an opportunity be afforded for remarks before we vote on the question, on the deaths of the different parties?

The CHAIRMAN: Mr. Herr.

MR. JOEL A. HERR: I think I would be remiss in my duty if I did not have anything to say concerning the death of my old friend, Thomas J. Edge. I regard Thomas J. Edge as one of the greatest workers and educators along agricultural lines that we have ever had in the State, a man whose word was as good as his note, a man whose word was not disputed, whose authority was recognized, and indefatigable worker who accomplished a great deal of work in a short time; modest in his pretensions, devoted to his work closely, right down as long as he was officially connected with the Board or with the Department. In his declining years he was unfortunate enough to be blind, his faithful wife having to take care of him for years. In the death of Secretary Edge we have lost an example of fidelity to our cause. We have his example before us, I think, unequalled by any other member of the Board, I think the records of the Board will show that he has done more work and there was more published under his signature, by his authority than any other officer of the Board, and I was very sorry that in his declining years, having dropped out of the work and being unable to be present at any of our meetings, that he was neglected more than he should have been. We should have visited him more. I visited him about a year ago, and while he was cheerful, yet there was a sadness about his affliction that I was sorry for. Now I might speak of the other members who have died. They have all been active, good members. I was very well acquainted with them all. I traveled over this state a good long time with Prof. Heiges and he was always an acceptable lecturer in the State of Pennsylvania. I think the example he set before us are worthy of emulation, and while we are sorry for his death, we will emulate his good works.

MR. SEAMANS: I would like to speak a word for my friend and neighbor, Henry W. Northup. Henry W. Northup was a speaker for the State Board of Agriculture for some 16 years. He attended our meetings; he was a good, conscientious man; we always heard his voice at our meetings. He was a wonderful Sunday-school worker. I attended the funeral, and 20 little girls and boys from

four years of age up to perhaps ten, carried flowers and laid them on his casket. He was a man who was successful in life financially. He believed in doing all things well. Peace to his ashes.

The CHAIRMAN: Are there any other remarks? We will kindly have a rising vote on this.

The report was then adopted by a rising vote.

The CHAIRMAN: Is there any other business to come before the Board?

MR. J. ALDUS HERR: After adjournment, I wish the Committee that was appointed at the forenoon session would remain in the room. The Committee are Mr. Weld, Mr. Fenstermacher, Mr. Frank Ranck and Mr. Studholme.

The CHAIRMAN: The members of that Committee heard Mr. Herrs request. Is there any other business?

MR. JOHN SHOENER: We have had with us at these meetings a very distinguished gentleman, who, for a number of years, has been at the head of the leading organization of farmers of Pennsylvania, and I believe we will all be glad to hear from him. I refer to Past Master W. F. Hill, of the Pennsylvania State Grange.

MR. HILL: That is very kind, I am sure, and I appreciate it very much. Thank you, Mr. Chairman and friends, but the hour is late, the weather is warm, conditions are unfavorable and I think the best thing I can do is to sit down and say that in the future I hope to meet with you annually. (Applause).

The CHAIRMAN: Is there any other business? If not, a motion to adjourn will be in order.

On motion the Board then adjourned.

CHARLES E. PATTON,
Secretary.

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**DEPARTMENT OF AGRICULTURE
DAIRY AND FOOD BUREAU**

BULLETIN No. 279

PRELIMINARY REPORT

OF THE

**Dairy and Food Commissioner
FOR THE YEAR 1915**



CHAS. E. PATTON, Secretary of Agriculture

JAMES FOUST, Dairy and Food Commissioner

Published by Direction of the Secretary

**HARRISBURG, PA.:
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LETTER OF TRANSMITTAL.

Harrisburg, Pa., December 31, 1915.

Hon. Chas. E. Patton, Secretary of Agriculture:

Dear Sir: I have the honor to submit herewith a preliminary report of the Dairy and Food Division of the Department of Agriculture for the year ending December 31, 1915. It covers the operations for the year and contains such other details as may be useful for public information. I have the honor to remain,

Very respectfully,

JAMES FOUST,
Dairy and Food Commissioner.



PREFACE

Owing to the fact that the full Report of the Department of Agriculture for the year 1915, containing the Reports of the several Bureaus of the Department will not be ready for distribution for some weeks, the Dairy and Food Commissioner has prepared the following preliminary report. In order that the information it contains may have as prompt and wide circulation as possible, its publication as a bulletin of the Department is authorized.

The complete report of the operations of the Dairy and Food Bureau will appear in the regular Annual Department Report.

CHAS E. PATTON,
Secretary of Agriculture.



THE PENNSYLVANIA FOOD LAWS

In the paragraphs introductory to my preliminary report for the year 1914, I presented a list of the fifteen laws then in force, for the enforcement of which this Bureau was held responsible. These laws were of three classes:

First. A General Food Law providing against the adulteration and misbranding of foods in general.

Second. Special food laws making particular provisions covering the sale of milk, cream, cheese, renovated butter, oleomargarine, ice cream, fresh meat, poultry, game and fish, lard, sausage, fresh eggs, vinegar, fruit syrups and non-alcoholic drinks.

Third. A Cold Storage Law covering the operations of cold storage warehouses, the storage of certain foods therein, and the sale of these foods after such storage.

The Legislature of 1915 has but slightly modified the body of laws above referred to. The Act of June 8, 1911, established a minimum standard of milk of three and one-fourth per cent butter-fat and twelve per cent. of milk solids, but an amendment dated June 2, 1915, has further provided that, in cases where the butter-fat content of milk is not below three per centum and the milk is otherwise pure and wholesome, the Dairy and Food Commissioner shall not institute legal proceedings against the producer or vendor of the milk in question if said producer or vendor shall furnish a satisfactory affidavit that nothing has been added to or taken from said milk.

The act dated May 5, 1915, regulating the sale of chicory mixed with coffee has been added to the list of the laws with whose enforcement this Bureau is charged.

RELATION OF THE DAIRY AND FOOD BUREAU TO THE DEPARTMENT OF AGRICULTURE.

The first step in the history of this Bureau was taken by the dairymen and farmers of the State when, at their urging, the Legislature created the office of Dairy and Food Commissioner and made it a branch of the service with which the State Board of Agriculture was charged. Prior to that time, there had been several laws upon the Statute books regulating the sale of oleomargarine and providing against the adulteration of cider vinegar and the sale as such

of various artificial substitutes for this orchard product. These early laws had comparatively little effect in preventing the abuses they were designed to correct, largely because there was no executive officer made specifically responsible for their enforcement. It was the aim of the farmers and dairymen to have the office conducted by a man familiar with the farming and dairying industries and in touch with the methods and conditions of these industries. The first Dairy and Food Commissioner was the Honorable Eastburn Reeder, who was appointed by the president of the State Board of Agriculture in 1893.

When in 1895 the Department of Agriculture was created at the desire of the farmers of the State to furnish an agency more compact and capable of closer co-ordination with the other executive officers of the State than was possible in the case of a body so large as the State Board of Agriculture, the office of the Dairy and Food Commissioner was made subordinate to that of the Secretary of Agriculture, and the Dairy and Food Bureau was created as one of the major divisions of the Department of Agriculture. Honorable Levi P. Wells was the first Dairy and Food Commissioner appointed by the Governor under the reorganization. The farming and dairying industries of the State have continued to maintain a deep interest in the work of this Bureau, have co-operated with it in its endeavors to secure a betterment of the food sale conditions, and clearly regard it as chiefly an agency for the safeguarding of important farm industries. Every branch of the State service presents a variety of relations and aspects, and there are frequent differences in opinion as to which of these should be regarded as that upon which the organization relations of the agency should chiefly be based. Such differences of opinion have been expressed with regard to this Bureau; but it is respectfully urged that, in view of the history of this branch of the State service, any change in its departmental relationship would be regarded by the farmers of the State as divesting them very largely of the values which they strove to gain in securing the creation of this Bureau in the Department of Agriculture.

DESIRABILITY OF EXTENSION OF PRESENT FOOD LAWS

It will be shown in later parts of this report that, since the first enactment of the General Food Law of 1895, a very radical improvement in the condition as to freedom from adulteration of the foods sold in Pennsylvania markets has taken place. The addition of undesirable preservatives and of deceptive and possibly injurious colorings has largely disappeared. The label descriptions of foods are less frequently deceptive. The sale of imitations and substitutes

is, with rare exceptions, made under properly distinguishing names and label statements. The chief point of criticism remaining, relates to the conditions of production, transport, handling, exposing for sale, and delivering to consumers of the various food products, and to the occasional use of raw and partially finished food materials that are diseased, more or less decomposed, or otherwise undesirable for similar reasons.

Undoubtedly the most important development in the food control work of many of the States of the Union in recent years has been the extension of the Service for the purpose of securing the public from the results of the use of unsanitary materials and from the preparation and handling of foods under unsanitary conditions.

It is true that paragraph six of section three of the General Food Law was designed to secure the public against unsanitary conditions in food manufacture and handling.

It might therefore appear to the casual reader of the General Food Law that its provisions are adequate to secure for the citizens of Pennsylvania the same measure of benefits that the sanitary food laws and regulations of other states such as, for example, Indiana, Louisiana and North Dakota, are affording the citizens of those commonwealths. A careful investigation of the General Food Law in these respects must, however, very promptly lead to a different conclusion. As a matter of fact, under the Pennsylvania Food Act of 1909, the history of the raw materials and the conditions of preparation and handling must be determined solely by the examination of the finished article after its sale to the consumer or to the Bureau's agent representing the consumer. The discovery of the facts that should be known is necessarily very incomplete where the means of discovery are so limited, and this phase of the food service in Pennsylvania is, therefore, much more inadequate than that which is given by many states to their citizens through their food control agencies. The man who is careless in making the foods that others are to eat, inclines to sneer at a declaration of need for cleanliness in this connection. He says that what people don't know won't hurt them; that the offense is rarely against the health in any considerable measure; that mere sentiments alone are concerned and that it would be a pity to disturb ignorance so blissful to the ultimate consumer. But civilized beings are not satisfied with the rude kitchen and table manners of the savage. The civilized man's eating is not merely a mode of getting bodily nutriment, let us say. In the well-conducted home, the table is the center of good cheer and no food will be welcomed to the menu as to whose sanitary quality and history there is even remote suspicion. Where food is domestically produced and prepared, the cleanliness and soundness of the food and of the utensils

used in its preparation are matters of prime importance in every well-conducted household. The people have a right to expect and to make sure that when their food supplies are produced and more or less fully prepared in centralized factories, the conditions of soundness and cleanliness shall be maintained just as much as they would be under the eye of the skillful housewife. Undoubtedly, reasonable legislation designed to secure these conditions is regarded as desirable by the average consumer.

It is not here meant to imply that the general conditions of food production and handling are gravely unsanitary or that exceedingly undesirable food materials are used in preparing the staple products. There are, however, many individual cases where the buildings in which foods are manufactured are gravely unsanitary, where the care of the persons of the employees is not what it should be, where water supplies are unfit, where there is undesirable contact of the persons of the employees with the food materials, where the foods in course of preparation are not adequately protected from dust, flies, and other contaminating agencies; and the existence of shops handling food wares in ways undesirable from the sanitary standpoint, is a matter of everyday knowledge. The far-sighted, enterprising food producers and food vendors realize that the existence of such establishments has a disproportionately large effect upon public confidence in all foods that are not homemade, and that the result is a considerable reduction in the volume of the trade which they would otherwise secure. While they very naturally object to laws and general statements which may reflect upon the conduct of their own establishments, many are desirous of having offenses existing in less carefully conducted factories and shops, reduced. As specific instances of this attitude upon the part of progressive food producers may be cited the resolution adopted by the Pennsylvania Association of Ice Cream Manufacturers in favor of the enactment of such sanitary measures as shall correct the abuses in certain small ice cream factories in densely populated parts of our cities; also the report of the Committee on Sanitation of the National Cannery Association, which urges sanitary legislation much more drastic and rigid than any Food Commissioner in America has ventured to propose.

What is needed is additional power on the part of the Dairy and Food Commissioner to supervise the conditions of production, manufacture, sale and delivery, and, so far as it may be necessary, to safeguard the soundness of materials and the sanitariness of surroundings essential to the production and delivery of clean, sound foods. Surely the policy of adopting modern methods for the prevention of undesirable conditions is more rational than the condemnation of products after their appearance upon the markets, for the former method conserve the food supply, the latter tends to waste it.

In this connection I welcome the opportunity to call attention to the progress made in some of our sister commonwealths in the elimination of unsanitary conditions in food manufacture and sale, and to note that these improvements have been secured without recourse to more drastic procedure of the courts. The food agents in these states visit not to punish, but to help. The introduction of methods of scoring factories, warehouses and shops as to sanitary conditions and the publication of scores, have developed a wholesome competition between food factories and food shops without the need for recourse, except in very rare cases, to legal proceedings as a means for obtaining obedience to the law and the marked improvement in sanitary conditions. There is no good reason for believing that the same policy would not be likewise productive of desirable results in Pennsylvania. Under this policy, the Food Commissioner, cooperating with the food producing and selling interests, does little more than promote the organization of these interests for their self-improvement.

It is true that such a policy would be an innovation in connection with food control work in Pennsylvania. Constructive work on the part of the Dairy and Food Bureau has in the past been practically impossible because there has been no legal authorization of such action and no financial provision for its maintenance. There is much ground for a complaint of injustice on the part of food producers and sellers, when statutory offenses are created by laws of very general scope, without some balancing provisions for assistance to the producing interests in solving the new problems raised by the new requirements. An attitude of reasonable consideration and helpfulness on the part of the State toward those whose business is subjected to those requirements should, it seems to me, appeal to every sensible citizen.

It may be objected that the suggested legislation would entail large additional expense. But experience elsewhere has shown that most of this work can be performed without any increase, or at least any large increase, in the number of agents required for such service as is already performed in Pennsylvania by the Food Bureau. All that is necessary is, in some cases, a little additional expert service and the careful instruction and organization of the working force for their added labors. The result elsewhere has been a marked gain to the public with very little additional cost and, where the policy has been constructive, with no serious demoralization of the producing and selling interests. Quite the contrary, the attitude of these interests has been one of welcome for the construction policy, which has won a more hearty cooperation for all the work of the food law executive.

There is another department of the food service, using the word "food" in its broader sense, which is at present lacking the necessary authorization for satisfactory control, namely, that comprising the production and sale of alcoholic liquors. It was undoubtedly the intention of the framers of the original General Food Law of 1895 that that law should act in the case of liquors as well as of foods, to guard against adulteration and misbranding, but a flaw in the title of the act gave ground for a decision by the Supreme Court, a few years later, that arrested all action by the Bureau to prevent the adulteration and misbranding of these commodities. There is certainly no sound reason why abuses of this character in the case of liquors should be any less condemned and less guarded against than in the case of foods, for both are articles of human consumption. The status of the production and sale of alcoholic drinks is now a matter of worldwide discussion. Whatever the public decision may be upon questions of local option and prohibition, it is clear that the fact of the present agitation upon these matters of public policy, should not be made the ground for the non-protection of the public against adulteration and fraud in case of alcoholic drinks so long as their use continues. I would respectfully urge that proper steps be taken to reenact the legislation necessary to prevent adulteration and fraud in the liquor trade.

EXECUTIVE ORGANIZATION.

The history of American police laws has shown the existence of a marked tendency to subdivide between numerous isolated offices the responsibility for the enforcement of laws dealing with the same subject matter. This tendency has various reasons for its existence. But the adoption of this kind of provision for dealing with subject matter of a single broad class necessarily results in much duplication of labor, overlapping of responsibility, executive confusion and jealousies, and a lack of proportion in the treatment of such matters as a whole. The same reasons which have operated to produce this condition of affairs in other commonwealths, exist also in Pennsylvania. It is earnestly urged that the opposite policy has proved in general more efficient and economical and far less vexatious to the interests under control than is the case where representatives from separate branches of the State Service visit and demand attention, one after another, from the same factory manager or store keeper.

FEDERAL RELATIONS.

When the passage by Congress of a National Food and Drugs Act was under discussion, the first argument in favor of such enactment was that it would assist in unifying and harmonizing the bodies of

food control law and regulations in the several commonwealths. In fact, the Food and Drugs Act of 1906 has been copied literally in many of the states and much of the confusion existing prior to that date has disappeared. Absolute uniformity in the laws of the several commonwealths upon any subject is, however, rarely, if ever, attained. Many are of the opinion that absolute uniformity would stand in the way of progress and improvement. On the other hand, there can be no sound objection to the cultivation of such cooperation between the National and State agencies that shall reduce confusion, strengthen advantageous policies and give to all the benefit of the knowledge and experience gained by each. I desire to express at this point my appreciation of the service which the United States Department of Agriculture is performing for the food control officers of the several states through its newly established office of State Relations, which is serving as a clearing house of information useful to food law officers.

LEGAL OPINIONS.

The discussion of this part of my report would be incomplete without reference to matters of general interest which have been made the subject of opinions by Deputy Attorney General William M. Hargest, in reply to questions addressed to the Attorney General from this office. The first of these opinions relates to the question, "whether a merchant holding a license to sell oleomargarine at retail can take orders for this product in cities and towns other than the one designated in the license, and fill such orders by delivering the product by vehicle or otherwise," a question of grave importance under the Pennsylvania Oleomargarine Law. The second opinion is in relation to a question of the limits of application of the Pennsylvania State Food Law where the commodity is also subject to the provisions of the National Food and Drugs Act. Several years ago in the case known as McDermott vs. Wisconsin, the United States Supreme Court handed down a decision determining this matter in relation to a particular case, and in so doing expressed certain principles that should govern the interpretation of this opinion as applied to other cases. This decision has led to considerable difference in the judgments of various legal authorities, and for the guidance of the Dairy and Food Bureau the question was referred to the Attorney General's Office for an opinion, which was prepared by Deputy Attorney General William M. Hargest. These two opinions are presented in full as papers Nos. I and II of the appendix to this report. The matter of the latter opinion is so important in its relation to the general question of the police powers of the State, that it should interest every citizen.

SUMMARY OF THE BUREAU'S ACTIVITIES DURING 1915.

The organization of the Bureau has been little changed during the past year, and the methods of operation found successful in the early years of the service, have been continued with little modification.

In the immediately following paragraphs is presented a summary of the Bureau's operations during 1915. Such matters of detail as require mention will be reserved for a later section of this report.

During 1915, the chemists of the Department analyzed 8,939 samples of various food stuffs and there were 1,165 prosecutions terminated for violations of the Food Laws. The several classes of materials on account of whose adulteration or misbranding these prosecutions were instituted are as follows: Milk, 625; Coffee and Chicory, 2; Cold Storage foods, 76; Eggs, 17; Food, 176; Ice Cream, 41; Lard, 8; Non-Alcoholic Drinks, 76; Oleomargarine, 16; Renovated Butter, 2; Sausage, 25; Vinegar, 101.

There was a large increase in the number of oleomargarine licenses during the year, due to the vigilance of the field agents in prosecuting dealers selling without license.

The receipts* of the Dairy and Food Division for the past year were \$279,055.40, as against \$225,910.78 in 1914. This money has been deposited with the State Treasurer for the use of the Commonwealth and is shown to be \$193,154.04 in excess of the expenditures, which are provided for by special appropriation.

In the following table the numbers of samples analyzed and of cases terminated, and the receipts and expenditures during the period beginning with 1907 and ending 1915 are stated:

Year	Samples analyzed	Cases terminated	Receipts	Expenditures
1907,	7,400	664	\$55,732 63	\$73,455 88
1908,	8,300	300	54,580 62	69,963 20
1909,	6,200	797	86,594 15	83,700 00
1910,	5,584	867	110,802 95	79,661 05
1911,	8,200	1,029	120,963 43	83,083 15
1912,	7,204	1,049	124,125 49	81,853 55
1913,	6,846	1,025	173,789 76	75,587 12
1914,	4,827	1,010	225,910 78	73,371 41
1915,	8,939	1,165	279,055 40	85,901 38
	63,510	7,706	\$1,243,585 26	\$711,487 32

It will be seen from these figures that 1915 has been a record year with respect to each of the items included in this table. It would be an error to judge that food adulteration and misbranding

*For a classified statement of receipts and expenditures, see Appendix V.

are increasing because the number of cases terminated has been greater in 1915 than in any preceding year. The condition of the food market shows exactly the opposite to be the fact. The increasing number of cases is the result, in part, of the increased number of examinations; in part, of improved methods of examination whereby defects that previously eluded proof, can now be established with certainty; in part, to the increased experience of the agency force; and, in part to additional legislation that has defined some of the offenses more specifically.

• While the major portion of the time of the Bureau's experts has, as in the past, been devoted to the current examination of miscellaneous food samples, as they have been received, it has been found possible to provide for two investigations of a more general character. The first of these was undertaken for the purpose of better enforcement of the Milk Law and was assigned to Professor C. B. Cochran, of this Bureau. This investigation related particularly to the comparative composition of the milks from different breeds of cows, with an additional study of the composition of butter, particularly in relation to its water content. The results of these investigations appear in Bulletin No. 268 of this Department, written by Professor Cochran, who has brought together in it not only the results of his own work, but the work of other American milk investigators relating to the same subject. This bulletin will be of value to every food analyst and should be of interest to all milk producers and vendors.

The second investigation deals with tomato ketchup and was made under the direction of Dr. C. H. LaWall of this Bureau. Its purpose was to make a general survey of the condition of the tomato ketchup on sale in the State with respect to the use of preservatives, saccharin, and artificial colors, the concentration of the ketchup, its acidity and the presence of moulds and bacteria. The results of this survey are printed in Bulletin No. 272. The condition of this very generally used table sauce was found to be gratifyingly excellent.

MATTERS OF SPECIAL COMMENT AS TO ADULTERATION IN PARTICULAR CLASSES OF FOODS.

In the foregoing summary it was stated that 8,939 samples of various foods were analyzed or otherwise examined. The numbers of samples of the several classes of foods are grouped in accordance with the laws under which they were examined, and are as follows:

Butter,	263
Cheese,	5
Cream,	1,025

Milk,	5,193
Cold Storage Products,	108
Eggs,	168
Fruit Syrups,	7
Ice Creams,	325
Lard,	10
Non-Alcoholic Drinks,	354
Oleomargarine,	65
Renovated Butter,	2
Sausage,	62
Vinegar,	371
Food,	900
Miscellaneous,	81
	<hr/>
	8,939
	<hr/>

A detailed summary of the subordinate kinds of foods examined, is presented in paper No. III of the Appendix. In paper No. IV of the Appendix is presented a classified list of the cases terminated, including a statement of the kinds of foods which were adulterated and misbranded and the general nature of the offense. It should be recalled that this list of cases terminated does not correspond precisely with the respective groups of foods collected for examination and examined during 1915. As stated repeatedly in previous reports, publication of legal proceedings under the food acts is deferred until the courts have pronounced judgment upon the cases presented for their decision. It follows necessarily that, owing to the time required for the legal proceedings, a case terminated in one year may have been instituted as the result of examinations made the year preceding. For the purpose, however, of a general survey of conditions, this lack of correspondence between samples examined and cases terminated within a given period, may be overlooked.

OLEOMARGARINE.

The goods effects noted in my report of 1914, resulting from the amendment of 1911 of the Oleomargarine Act so as more specifically to fix the color limit for oleos, has continued also during 1915. My judgment that oleomargarine sold under conditions such as to prevent its confusion with butter and such, also, as to permit the development of its best flavors without impairment by cottonseed oil and like high flavored ingredients, would find it an increasing market, has been amply confirmed. At the same time, butter has found a market on its own merits and free from the disadvantages that existed so long as the buying public could not tell clearly at the time of

purchase which of these two products it was securing. During the year, about sixty-five samples were examined and sixteen cases terminated for violation of the law. Of these sixteen cases, but four were instituted because of coloration of this product contrary to law. The remaining twelve cases were due to sales without proper license.

The market for renovated butter continues to be very small. The number of samples found on sale are very low; but two samples of this material were examined during the past year and two cases terminated because this product was sold without the required license.

VINEGAR.

Few food products have been subject to so many phases of adulteration and misbranding as cider vinegar. The preservation of a market for cider vinegar upon its own merits is of prime importance to the orchardist. While there are a number of wholesome vinegars produced from other materials, cider vinegar continues to have the chief demand in Pennsylvania. It is no secret to vinegar producers that the skill used in imitating cider vinegar is unsurpassed in other lines of food production and renders very difficult the task of the food experts working for the protection of the public. The Bureau has maintained its full measure of activity to discover and prevent frauds of this character. During 1915 three hundred and seventy-one vinegars were examined and one hundred and one cases terminated for violation of the Vinegar Law. Twenty of these cases were terminated because the vinegars were found to contain added water. In two or three instances the product was so low in acetic acid as not to be entitled to the name "vinegar." Nearly all the other cases were brought because the products were found to be either entirely made up of substitute materials or to consist of mixtures with cider vinegar.

MILK.

Fifty-one hundred and ninety-three samples of milk were analyzed and nearly five hundred cases were terminated because of adulterations of this product or because it contained less than the standard amount of butter-fat or solids. In one case only was added preservative (formaldehyde) found. In over two hundred and thirty cases, the evidence and tests showed adulteration of the original composition of milk by watering or skimming, or both. In the remainder of the cases, the examination indicated no more than that the milks were sub-standard in composition.

CREAM.

Ten hundred and twenty-five samples were examined and one hundred and thirty-one cases terminated because the creams were of less richness than the law required for sale under that name.

BUTTER.

Two hundred and sixty-three samples of butter and five samples of cheese were analyzed. These examinations resulted, however, in the termination of no cases.

ICE CREAM.

Ice creams to the number of three hundred and twenty-five were subjected to analysis, and forty-one cases terminated for adulteration, all of them because the ice creams in question contained less than the required amount of butter-fat.

MEAT.

Meat products other than cold storage foods included one hundred and seventeen samples of fish and oyster products and forty-seven samples of canned and fresh meats. But ten cases were terminated for adulteration of these products, most of them because the meats were so far decomposed to be unfit for food purposes, and several because goat meat was sold under the name of "lamb," and because baby veal was being offered for sale, in one case, because the material, hamburg steak, was adulterated with sulphur dioxide.

SAUSAGE.

Sixty-two samples were analyzed and twenty-five cases terminated. Out of these cases, three were brought because the sausage had become unfit for food; three because sulphur dioxide had been added; eight because cereals or vegetable flour had been used as an ingredient contrary to law; sixteen because an excess of water was found in the sausage; and in one case, beef sausage was sold as and for pork sausage.

LARD.

But ten samples of lard were analyzed during the year and eight cases terminated for adulteration or misbranding. In three of these cases, defective labeling was charged; in five, the addition of cottonseed oil and beef stearin as substitutes in part for lard fat proper.

SAMPLES EXAMINED UNDER THE GENERAL FOOD LAW.

The examination of the food supplies coming particularly under the General Food Act included the analysis of over nine hundred samples. One hundred and seventy-six cases were terminated for

offenses under this act. Of these cases, sixty-nine, or over one-third, were instituted because of the use of sulphur dioxide, without declaration, usually in dried fruits where the law specifically permits the use of this preservative and bleaching agent, but requires that its presence be declared. This large proportion of cases of this character indicates the need for much larger exercise of care on the part of food dealers to observe the requirements of the general law. The use of benzoate of soda in excessive amounts—that is, in amounts beyond the limits fixed by law, or in materials in which it has not commonly been used, is very much more limited than it was a few years ago. Sixteen cases, or about one-eleventh of the entire number terminated, were instituted because of the illegal use of this preservative. There were three cases, also, in which imported peas were found to have been colored green by the use of compounds of copper. Of the same general class of cases, may be mentioned three of flour bleached by the use of nitrites.

Decomposition and contamination were, despite the difficulties of their detection, the bases of condemnation in thirty-six out of the one hundred and seventy-six cases terminated.

In this connection may be mentioned the special investigation made during the summer of 1915 to determine the condition of the breakfast foods in stock at the close of the summer season. The Bureau has, as a policy growing out of the condition found in a general examination made some years ago, sent each summer to every grocer a warning as to the care of breakfast food stocks. The examination of 1915 was made by Dr. William Frear of State College, Pennsylvania, who had conducted the original examination for this Bureau. The samples taken for the present examination represented very broadly the stocks of the various brands of breakfast foods found in stores in all parts of the State. The scope of the examination was limited almost exclusively to the condition of the food in respect to insect attack, and was not of such extent as to furnish material appropriate for bulletin publication. The results of this examination were most gratifying. The stocks were found in almost every instance to be in fresh cartons, clean and free from weevil attack. Pronounced contamination of this character was found in but a single sample of goods much shelf-worn. The grocers of the State are to be highly complimented for their improved care of their stocks of this class, and the public to be congratulated likewise because of the advantages this improvement affords to every consumer of breakfast food.

The general freedom of staple groceries, including canned goods, and spice supplies in particular from serious adulteration and misbranding, continues to merit specific mention. It would be a grave error for food officers to claim the exclusive merit for the vast im-

provement in these food supplies. Certainly no less credit is due to the public-spirited efforts of the Wholesale Grocers' Associations and of such progressive organizations of food producers as the National Canners' Association. The general support which such organizations have given to the relief of the public from the evils out of which grew our body of food laws, deserves high praise.

CANDIES.

Of sixty-seven samples of candy, chiefly of the cheaper "penny" varieties, only four cases were terminated. All of these cases related to so-called "licorice" products from which licorice was either entirely or almost entirely absent and imitation colors and flavors replaced it.

The appearance of glucose as an adulterant has almost disappeared. Among the cases terminated there was but one, that of honey, in which adulteration of this substitute material was found.

COFFEE.

Forty-two samples of coffee were examined and nine cases were terminated under the General Food Act for adulteration with chicory or with chicory and cereals, and two cases under the Chicory and Coffee Act of 1915 because, in one case, of the presence of cereals, and in the other case because of misbranding.

NON-ALCOHOLIC DRINKS.

Three hundred and fifty-four samples of these drinks were examined and seventy-six cases terminated. Of these, two cases were brought because the preparations were intoxicating liquors sold under the names of non-alcoholic drinks; twenty-six because of the use of saccharin; twenty-four because of the presence of undeclared artificial colors and flavors; and twenty-seven because of misbranding.

COLD STORAGE ACT.

There remains for consideration the enforcement of the Cold Storage Act. Some idea of the volume of the cold storage business during the year covered by this report may be gained from the sub-joined table. This table states the amounts of cold storage food, by classes, found in storage on March 31st, June 30th, September 30th and December 31st, 1915. These data are compiled from the quarterly reports required by law from the various cold storage warehousemen.

QUANTITIES OF FOODS IN PENNSYLVANIA COLD STORAGE WAREHOUSES.

Foods.	Units of quantity.	1915, March 31.	1915, June 30.	1915, Sept. 30.	1915, Dec. 31.
Meats:					
Whole carcasses:					
Beef,	Lbs.	888,623	31,300	164,967	588,685
Veal,	Lbs.	14,856	15,014	31,824	16,821
Lamb and mutton,	Lbs.	256,843	86,926	70,881	241,002
Hogs,	Lbs.	539,362	277,462	60,606	369,421
Parts of carcasses, classified:					
Beef,	Lbs.	1,520,649	1,151,422	958,536	787,966
Veal,	Lbs.	5,429	26,563	36,159	47,796
Lamb and mutton,	Lbs.	87,623	33,464	33,242	67,435
Hogs,	Lbs.	1,255,696	1,102,643	592,311	823,817
Game,	Lbs.	7,422	6,978	7,016	8,738
Flah,	Lbs.	406,912	1,800,188	4,190,388	4,172,492
Domestic poultry,	Lbs.	3,433,743	2,361,479	1,039,576	2,306,311
Eggs:					
In shell,	Doz.	1,677,763	18,800,169	15,904,351	2,613,541
Broken,	Lbs.	322,109	362,878	462,619	338,205
Butter,	Lbs.	906,040	4,964,877	9,744,913	3,452,796

The use of cold storage facilities for the storage of foods for periods of less than three months is very large. For this reason, the above given quarterly statements fail to afford a proper notion of the entire volume of foods held by cold storage warehouses in this State. The attitude of the cold storage warehousemen toward the enforcement of the act has been willing, in spite of the vexations due to certain terms of the law. The complaint continues that the Pennsylvania Law deprives the Pennsylvania warehouses of some business which would normally be theirs, and that the reason for this deprivation is the fact that neighboring states have no like laws. On the other hand, it is clear that if one state waits until all the states have acted or are ready to act in concert, protective legislation necessary for the public good must be indefinitely postponed. The present Cold Storage Law is criticised because of the specific time limits it imposes on the storage of different classes of foods. It is possible that amendments of these limits might be advantageous and also that some clearer and more practical definition of the cold storage warehouse and the cold storage process could be devised. On the other hand, none of the substitutes which have been brought to consideration of this office provides so adequately for the protection of the people against the sale of cold storage foods as fresh, nor so well provides for the tracing of cold storage foods from the warehouse to the consumer. The advantages of the present law in these two particulars are certainly very marked.

The inspection of warehouses as to their equipment and sanitary condition continues to reveal a very satisfactory state of affairs.

The warehousemen show entire willingness to meet promptly any reasonable suggestion in respect to sanitary conditions. The examinations of cold stored foods have been very numerous, and the examinations of such foods by chemical experts were one hundred and eight. Seventy-six cases were terminated for violation of the Cold Storage Act of 1915; three because the foods were stored beyond the legal limit; sixty-seven because the stamping requirements were not observed; and five because cold storage eggs were sold as and for fresh eggs. The difficulties of detection of cold stored eggs imported from other states as fresh eggs have been, in part at least, removed as the result of the investigations made by experts of this Department.

One hundred and sixty-eight examinations of market eggs were made, of which one hundred and twenty-three represented fresh eggs in shell, and the remainder either frozen, canned or opened stock. The experts of the Bureau have given special attention to the means of distinguishing between fresh eggs, held eggs, and cold storage eggs. Especial recognition should be given to the work of Dr. F. T. Aschman and Professor Charles H. LaWall in this relation. Seventeen cases were terminated: fourteen of which were because of the sale of eggs unfit for food purposes and three because of the having in possession of rotten eggs not properly denatured. The conditions of the egg supply in the markets and bakeries of our larger cities continue to exhibit very marked improvement as the result of the enforcement of the egg laws.

From what has been stated above, it is very manifest that most of the offenses charged under the Act of 1913 have been due to neglect of the stamping requirements. There was found in the cold storage warehouses a very much smaller amount of foods unfit for human consumption, than was present at the time the law went into force. The cold storage warehousemen cannot properly be held in equity as wholly responsible for the overstorage of foods. This is clear when it is recalled that the function of the warehouseman is simply to rent clean, cool space. The overstorage of foods is chiefly the fault of the renter. The fault is exclusively that of the warehouseman only in those cases of which he is the owner of the food stuffs stored.

ACKNOWLEDGEMENTS

I desire again to express in this connection my appreciation of the hearty support rendered to me by my office force, food agents, counsel and food experts, without whose intelligent, active and loyal assistance, the work of my Bureau could not have been successfully conducted. I am under obligation also to the Attorney General's Office, more especially to Deputy Attorney General William M. Hargest, to whose care the legal phases of the work of this Bureau have been specifically assigned, for cordial co-operation.

My acknowledgments are due also to Governor Brumbaugh, Secretary Critchfield and yourself for the warm encouragement and support I have received from my superior officers in the conduct of this work; and finally I may not, in fairness, omit to mention as important elements in the success of the work of this Bureau, the interest of the several courts of the State and of the public press.

Very respectfully,

JAMES FOUST,
Dairy and Food Commissioner.



APPENDIX

SUMMARY

The following gives a list of articles analyzed by Chemists of this Bureau during the year 1915.

Article	Number Analyzed
COLD STORAGE PRODUCTS:	
Beef,	1
Beef livers,	1
Beef and Sheep livers and kidneys,	1
Butter,	1
Eggs,	79
Fish,	9
Fish, Blue Pike,	1
Fish, Butter,	1
Fish, Sea Trout,	1
Fish, Smelts,	10
Fish, Whiting,	1
Pork loins,	1
Turkey,	1
	108
DAIRY PRODUCTS:	
Butter,	263
Cheese,	5
Cream,	1,025
Milk, butter,	2
Milk, condensed,	5
Milk, evaporated,	4
Milk, skimmed,	25
Milk,	5,150
	6,486
EGGS:	
Fresh, in shell,	122
Frozen,	13
Frozen, canned,	10
Opened,	10
	163
FOOD PRODUCTS:	
<i>Bread Cakes and Puddings:</i>	
Bread,	4
Cake, Chocolate,	2
Cake, Chocolate Iced,	2
Cake, Currant,	2
Cake, Famous,	1
Cake, Golden,	1
Cake, Golden Rod,	1
Cake, Goodie,	1
Cake, Italian,	1
Cake, Jelly Roll,	6
Cake, Layer,	2
Cake, Marble,	2
Cake (no name given),	4
Cake, Orange,	1
Cake, Sponge,	15
Cake, Tasty,	1
Cookies, chocolate covered,	1
Cornstarch,	2
Gelatin,	1
Gelatin, Granulated,	1
Go-Zo (Orange flavor),	1
Jello (Cherry flavor),	1
Jello (Lemon flavor),	1
Jello (Orange flavor),	1
Jello (Peach flavor),	1
Jello (Raspberry flavor),	1
Jello (Strawberry flavor),	2
Puddine (Lemon flavor),	1
Puddine (Orange flavor),	2
Pudding, chocolate,	1
Pudding, creamed,	1
Tapioca,	2

SUMMARY—Continued.

Article	Number Analyzed
FOOD PRODUCTS—Continued.	
<i>Breakfast Foods:</i>	
Aluminum Brand Crushed Oats,	1
Biltmore Wheat Hearts,	1
Banner Rolled Oats,	1
Brown's Triangle Breakfast Food,	1
Corn Flakes,	1
Corn-O-Plenty,	1
Cream Oatmeal,	1
Cream of Wheat,	1
Dillworth's Rolled Oats,	1
E-C-Corn Flakes, Toasted,	1
Edward's Brand Rolled Oats,	1
Elite Brand,	1
Farina,	2
Force,	1
G-O-Rolled Oats,	1
Grape Nuts,	1
H-O-Force Toasted Wheat Flakes,	1
Holland Rusk,	1
Honey Crisps Toasted Corn Flakes,	1
Jersey Corn Flakes,	1
Jersey Wheat Flakes,	1
Kellogg's Toasted Corn Flakes,	1
Mother's Crushed Oats,	2
Mother's Wheat Hearts,	1
Monarch Rolled Oats,	1
Malt Breakfast Food,	1
Maple Flakes,	1
Maple Flakes Whole Wheat, Toasted,	1
Medal Brand Corn Flakes,	1
National Oats,	1
National Rolled Oats,	1
Onward Brand Rolled Oats,	1
Oat Meal,	1
Oriental Rolled Oats,	1
Old Fashioned Scotch Brand Oatmeal,	1
Parched Farinose,	1
Pearled Barley,	1
Pettyjohn's Breakfast Food,	1
Post Toasties,	2
Post Tavern Special,	1
Premium Hominy,	1
Premier Oat Flakes,	1
Princess Royal Rolled Oats,	1
Puffed Rice,	1
Purity Brand Rolled Oats,	1
Quaker Corn Flakes,	1
Quaker Corn Puffs,	1
Quaker Puffed Wheat,	1
Rainbow Oats,	1
Ralston Wheat Food,	1
Rolled Oats,	4
Satisfaction Oat Flakes,	1
Saxon Rolled Oats,	1
Saxon Wheat Food,	1
Servus,	1
Servus Corn Flakes,	1
Shredded Whole Wheat,	1
Silver Flake Brand Corn,	1
Sunbeam Crushed Oats,	1
Toasted Corn Flakes,	1
Toasted Rice Flakes,	1
Trix Breakfast Food,	1
Un-Gro-Rolled Oats,	1
Uncle Sam's Health Food,	1
Victor Toy Oats,	1
Washington Crisps Corn,	1
Weldman's Pressed Oats,	1
Wheatena,	1
Wheatlets,	1
<i>Canned Fruits and Vegetables:</i>	
Beans,	1
Cherries,	5
Cherries, Cocktail,	1
Cherries, Maraschino,	23
Corn,	1
Mince meat,	2
Mushrooms,	2
Peas,	6

SUMMARY—Continued.

Article	Number Analysed
FOOD PRODUCTS—Continued.	
<i>Canned Fruits and Vegetables—Continued.</i>	
Peas, Spanish,	1
Pineapple,	1
Rhubarb,	1
Sauer Kraut,	1
<i>Dried Fruits:</i>	
Apricots,	8
Figs,	12
Peaches,	46
Pears,	1
Raisins,	6
<i>Catsup, Oil, Pickles, Sauces, etc.:</i>	
Catsup (no name given),	29
Catsup, Tobasco,	2
Catsup, Tomato,	194
Chow Chow,	1
Club Chutney,	1
Gherkins, Sweet,	9
Horseradish,	3
India Relish,	1
Oil, Cottonseed,	5
Oil, Olive,	14
Pickles, Dill,	2
Pickles, Sweet,	17
Pickles, Sweet Crooks,	1
Pickles, Sweet Mixed,	16
Pickles, Sweet Spiced,	2
Sauce, Chili,	1
Sauce, The Chef,	1
Sauce, Tomato,	1
Sauce, Worcestershire,	2
Salad Dressing,	2
Salad, Onion,	1
Salad, Tomatoette,	1
<i>Coffee:</i>	
Coffee, cups of,	15
Coffee, compound,	4
Coffee, ground,	10
Coffee, pulverized,	1
Eight O'Clock Breakfast Mixture,	1
Rhenus,	1
<i>Confectionery:</i>	
Bonbons, mixed,	1
Candied Figs,	1
Candy,	1
Candy, Brown,	1
Candy, Cane,	1
Candy, Girard Squares,	3
Candy, Green Ribbon,	1
Candy, Gum Drops,	1
Candy, Jelly Eggs,	1
Candy, Mixed,	4
Candy, Pink Ribbon,	1
Candy, Raspberry Flavor,	1
Candy, Red Ribbon,	1
Candy, Suckers,	1
Chocolate Almond Bars,	1
Chocolate Candy,	2
Chocolate Creams,	1
Chocolates, mixed,	2
Chocolate and Vanilla Candy Chickens,	1
Cocoanut Bonbons,	1
Cocoanut Caramels,	1
Cocoanut Squares,	1
Daffy Dill Candy,	1
Fudge, assorted,	1
Fudge, Cherry,	1
Fudge, Cherry and Raisin,	1
Fudge, Chocolate,	1
Fudge, Chocolate and Cocoa,	1

SUMMARY—Continued.

Article	Number Analyzed
FOOD PRODUCTS—Continued.	
<i>Confectionery—Continued.</i>	
Fudge, Coconut,	1
Jolly Cops Candy,	1
Licorice Candy,	1
Lolly Pops Candy,	4
Marshmallows,	5
Marshmallows, chocolate,	1
Marshmallows, strawberry,	1
Marshmallows, whip,	2
Montague Mello,	1
Prize Bag Candy,	1
Snow Flakes,	1
Walnut Candy Squares,	1
<i>Fish, Canned, Dried and Fresh:</i>	
Breakfast Roe,	1
Codfish,	44
Codfish, dried,	3
Codfish, flaked,	1
Codfish, salt,	2
Codfish, shredded,	9
Fish Cakes,	1
Fish, canned,	1
Fish, flaked,	2
Fish, fresh,	4
Fish, threaded,	1
Fish, Tuna,	4
Halibut,	1
Herring,	1
Oysters (fresh),	7
Salmon, canned,	8
Sardines,	20
Shrimps,	3
Shrimps, cooked,	3
Smelts,	1
Trout, Sea,	1
<i>Flavoring Extracts:</i>	
Lemon,	3
Orange,	2
Vanilla,	2
<i>Flour:</i>	
Flour, Buckwheat,	3
Cornmeal,	1
Flour, Graham,	1
Ka-Ko (prepared cake flour),	1
"Kaketop" (prepared cake flour),	1
Flour, rice,	1
Flour, soup,	1
Flour, wheat,	5
<i>Fruit Butters, Jams, Jellies and Preserves:</i>	
Butter, Peanut,	3
Jam, Blackberry,	1
Jam, Fruit,	2
Jam, Peach,	1
Jelly, Apple,	2
Jelly, Blackberry-Apple,	1
Jelly, Crabapple,	1
Jelly, Currant,	2
Jelly, Fruit (no flavor given),	1
Jelly, Grape,	1
Jelly, Grape-Apple,	1
Jelly, Raspberry,	1
Jelly, Strawberry,	1
Jelly, Strawberry-Apple,	1
Jelly, Wine,	1
Preserves, Peach-Apple,	1
Preserves, Raspberry,	1
Preserves, Strawberry,	2
Preserves, Strawberry-Apple,	1

SUMMARY—Continued.

Article	Number Analyzed
FOOD PRODUCTS—Continued.	
<i>Honey and Syrups:</i>	
Honey,	4
Syrup, crystal white,	1
Syrup, maple,	7
Syrup, table,	3
<i>Meats: Canned and Fresh:</i>	
Beef Butts,	1
Beef, Corned, canned,	1
Beef Loaf,	1
Beef, sliced,	2
Beef, sliced, smoked,	1
Beef Steak and Onions, canned,	1
Chicken,	2
Goat,	1
Hamburg Steak, canned,	6
Hamburg Steak, fresh,	1
Hog's Head,	1
Lamb, shoulder of,	1
Meat, canned,	1
Meat, Capicola,	1
Meat, cooked,	1
Meat, Crab,	1
Meat, potted (no brand given),	4
Mutton, leg of,	1
Pork,	1
Pork and Beans, canned,	1
Pork, shoulder of,	7
Pork, spare ribs, fresh,	2
Pudding and scrapple,	2
Turkey,	3
Veal,	2
<i>Soups:</i>	
Soup, Chicken,	1
Soup, Knorr,	1
Soup, Tomato,	1
<i>Spices, etc.:</i>	
Pepper, Black, ground,	2
Pepper, Cayenne,	1
Mace, Bombay,	1
Mace, ground,	1
Mustard, prepared,	1
	900
FRUIT SYRUPS:	
Orange,	1
Pineapple,	1
Raspberry,	4
Vanilla,	1
	7
ICE CREAMS:	
Bisque,	2
Caramel,	1
Cherry,	3
Chocolate,	20
Ice Cream (no flavor given),	11
Lemon,	1
Maple,	3
Maple-Walnut,	1
Maraschino,	1
Peach,	3
Pineapple,	2
Strawberry,	37
Vanilla,	226
	325

SUMMARY—Continued.

Article	Number Analyzed
LARD,	10
NON-ALCOHOLIC DRINKS:	
Birch Beer,	1
Cherry Bounce,	1
Cherry Cheer,	1
Cider, Apple,	2
Cider, Orange,	1
Cider, Sweet,	2
"Cream of Hops,"	2
Ginger Ale,	4
Grape Juice,	1
"Hebe,"	1
"Hop Tonic,"	1
Lemon Sour,	2
"Near Beer,"	1
Orangeade,	9
Orange Julep,	1
Phosphate, Cherry,	1
Pop, Lemon,	2
Pop, Orange,	2
Pop, Strawberry,	8
Root Beer,	9
Sarsaparilla,	7
Soda, Cherry,	4
Soda, Cream,	4
Soda, Lemon,	96
Soda (no flavor given),	5
Soda, Orange,	9
Soda, Pear,	1
Soda, Pineapple,	26
Soda, Raspberry,	80
Soda, Strawberry,	103
Soda, Vanilla,	2
"Sparkade,"	1
"Top Notch Grape,"	1
"White Ribbon Temperance Beverage,"	2
	354
OLEOMARGARINE,	65
RENOVATED BUTTER,	3
SAUSAGE:	
Sausage,	2
Sausage, Bologna,	6
Sausage, Fresh Pork,	37
Sausage, Frankfurters,	4
Sausage, Meat,	2
Sausage, Pork,	6
Sausage, Pork and Beef,	2
Sausage, Vienna,	2
Sausage, Wiener,	2
	63
VINEGAR:	
Vinegar, Amber,	1
Vinegar, Apple,	6
Vinegar, Cider,	233
Vinegar, Distilled,	17
Vinegar, Fermented Syrup,	10
Vinegar, Fermented Syrup, Distilled,	1
Vinegar, Glucose,	2
Vinegar, Malt,	27
Vinegar (no brand given),	1
Vinegar, Pickling,	3
Vinegar, Pineapple,	4
Vinegar, Red,	2
Vinegar, Rhine Wine,	1
Vinegar, Rex Amber Sugar,	1

SUMMARY—Continued.

Article	Number Analyzed
VINEGAR—Continued.	
Vinegar, Tarragon Flavor,	1
Vinegar, White,	16
Vinegar, White, Distilled,	8
Vinegar, White Wine,	8
	871

MISCELLANEOUS PRODUCTS:

Anchovy Paste,	1
Apples,	2
Baking Powder,	2
Canning Compound,	13
Chestnuts,	3
Cocos,	4
Cocoanut, shredded,	1
Codfish Cakes,	3
Codfish Tablets,	1
Crisco,	1
Egg Macaroni,	2
Egg Noodles,	11
Egg Powder,	1
Glace Apricots,	2
Glace Fruit (no name given),	2
Ham Fat,	1
Health Bran,	1
Ice Cream Cones,	2
Jell-O-Cream Powder,	1
Jello Ice Cream Powder,	1
Jello Ice Cream Powder, Chocolate flavor,	1
Jello Ice Cream Powder, Lemon flavor,	1
Jello Ice Cream Powder, Strawberry flavor,	1
Jelly Powder,	1
Junket Tablets,	1
Lemons,	1
Macaroni,	4
Meat-O,	2
Mushroom Powder,	1
Paste, Lobster,	1
Paste, Tomato,	1
"Polly Whats,"	1
Pulp, Tomato,	6
Radishes,	1
Rice,	1
Snow Mello,	1
Spaghetti,	2
Sugar, granulated,	1
	81

RECAPITULATION.

Butter,	263
Cheese,	5
Cream,	1,025
Milk,	5,132
Cold Storage Products,	105
Eggs,	168
Fruit Syrups,	7
Ice Creams,	325
Lard,	10
Non-Alcoholic Drinks,	354
Oleomargarine,	5
Renovated Butter,	2
Sausage,	62
Vinegar,	871
Food,	961
	8,989

CASES TERMINATED

THE FOLLOWING TABLE GIVES A LIST OF ARTICLES ANALYZED BY CHEMISTS AND FOUND TO BE IN VIOLATION OF THE FOOD LAWS, AND THE NUMBER OF SAMPLES OF EACH PRODUCT ON WHICH PROSECUTIONS WERE BASED AND TERMINATED.

COFFEE AND CHICORY ACT, 1915, IN VIOLATION OF—

Coffee Compound, misbranded,	1
Eight O'clock Breakfast Mixture, containing Cereal,	1
	2

COLD STORAGE ACT, 1913, IN VIOLATION OF—

Cold Storage Beef Livers, not properly marked,	1
stored beyond the legal limit,	1
Cold Storage Eggs, sold as and for fresh eggs,	5
not stamped as required by law,	63
stored beyond the legal limit,	1
Cold Storage Meat, stored beyond the legal limit,	1
Cold Storage Pig's Ears, not stamped as required by law,	1
Cold Storage Pork Loins, as chilled and not stamped as required by law,	1
Cold Storage Smelts, not stamped as required by law,	2
	76

EGG ACT, 1909, IN VIOLATION OF—

Eggs, frozen and canned, unfit for food purposes,	1
having in possession rotten eggs not properly denatured,	2
having in possession rots and spots not properly denatured,	1
stale eggs sold as fresh,	1
unfit for food purposes,	10
unfit for food purposes, to be used in bakery,	2
	17

FOOD ACT, 1909, IN VIOLATION OF—

Apricots, dried, contained sulphur dioxide,	10
Glaze, contained sulphur dioxide,	4
Brazil Nuts and English Walnuts, unfit for food purposes,	1
Butter, contained an excessive amount of water,	1
Candy, contaminated and unfit for food,	1
Candy Fudge, coated with a resinous glaze,	6
assorted, coated with a resinous glaze,	1
Cake, (no name given), artificially colored in imitation of eggs,	2
Sponge, artificially colored in imitation of eggs,	1
Catsup, (no name given), adulterated,	1
contained an excessive amount of sodium benzoate,	2
Tomato, contained an excessive amount of sodium benzoate,	5
Cherries, canned, contained sulphur dioxide,	2
Cocktail, contained sulphur dioxide,	1
Maraschino, contained sulphur dioxide,	5
Chestnuts, unfit for human consumption,	1

CASES TERMINATED—Continued.

FOOD ACT, 1900, IN VIOLATION OF—Continued.

Chicken, unfit for food purposes,	1
Chocolate Almond Dates, misbranded,	1
Candy chicks, adulterated,	1
Candy, mixed, colored with coal tar color in imitation of chocolate,	1
Cocoa, powdered, decomposed and unfit for food purposes,	1
Cocoanut Bon bons, contained cereals,	2
contained starch as a filler,	1
Squares, coated with a resinous glaze,	1
Coffee, adulterated,	4
contained chicory,	4
contained chicory and cereal,	1
Eggs, stale eggs sold as fresh eggs,	17
unfit for food purposes, using in bakery,	1
Egg Noodles, artificially colored in imitation of eggs,	1
Fish, unfit for food purposes,	2
Butter, unfit for food purposes,	1
Cod, contained an excessive amount of sodium benzoate,	2
Sea Bass, unfit for food purposes,	1
Shrimps, unfit for food purposes,	1
Flour, contained nitrites,	3
contaminated, unfit for food purposes,	1
Goat meat, sold as and for lamb,	1
Grapes, decomposed, unfit for food purposes,	1
Ham Fat, decomposed,	1
Hamburger Steak, contained sulphur dioxide,	1
Hickory Nuts, rancid and mouldy,	1
Honey, adulterated with glucose,	1
Licorice Candy Babies, adulterated,	1
contained no licorice,	1
Drops, adulterated,	1
Gum Drops, artificially colored and flavored,	1
Meat, decomposed,	2
diseased,	1
Milk, contained decomposed filth,	1
Olive Oil, adulterated,	1
consisting entirely of cotton-seed oil,	1
Orange Extract, adulterated,	1
Peaches, dried, contained sulphur dioxide,	47
Peas, canned, colored green with compound of copper,	2
Italian, colored green with compounds of copper,	1
Spanish, wormy, unfit for food purposes,	1
Pickles, contained an excessive amount of sodium benzoate,	2
Mixed, contained an excessive amount of sodium benzoate,	1
sweet, contained an excessive amount of sodium benzoate,	6
Pork Shoulders, decomposed,	1
Potatoes, decomposed, unfit for food purposes,	1
Rabbits and Muskrats, decomposed, putrid,	1
Raisins, contaminated, unfit for food purposes,	1
Raspberry Syrups, adulterated,	1
Veal, immature,	2

CASES TERMINATED—Continued.

ICE CREAM ACT, 1909, IN VIOLATION OF—

Ice Cream, Caramel, low in butter fat,	1
Chocolate, low in butter fat,	1
(no flavor given), low in butter fat,	2
Strawberry, low in butter fat,	5
Vanilla, low in butter fat,	32
	<hr/>
	41

LARD ACT, 1909, IN VIOLATION OF—

Lard, adulterated,	3
consisting of cotton-seed oil and beef stearin; sold for pure lard,	2
not properly marked,	3
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	8

MILK ACT, 1911, IN VIOLATION OF—

Cream, adulterated,	2
low in butter fat,	129
Milk, adulterated,	7
below legal standard,	15
below legal standard and partially skimmed,	1
below legal standard and watered,	6
containing formaldehyde,	1
low in butter fat,	65
low in butter fat and partially skimmed,	1
low in butter fat and total solids,	168
low in butter fat and total solids, partially skimmed,	11
low in butter fat and total solids, skimmed,	139
low in butter fat and total solids, watered,	41
low in total solids, watered,	13
low in butter fat and watered,	2
watered,	24
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	625

NON-ALCOHOLIC DRINK ACT, 1909, IN VIOLATION OF—

Birch beer, artificially colored,	1
"Blackberry," An intoxicating drink sold for non-alcoholic drink,	1
"Cherry," An intoxicating drink sold for non-alcoholic drink,	1
Cider, artificially colored and flavored,	1
Champagne cider, misbranded, not champagne cider,	1
Pop, Strawberry, artificially colored and flavored,	4
misbranded,	1
Soda, Cherry, Artificially colored,	2
artificially colored and misbranded,	1
Grape, misbranded, contained no grape, colored with coal tar dye,	1
Lemon, containing saccharin,	13
misbranded,	2
misbranded, contained no lemon juice,	3
Orange, containing saccharin,	1
misbranded,	10
misbranded, colored with coal tar dye,	3
Pineapple, containing saccharin,	2
Raspberry, artificially colored,	1

CASES TERMINATED—Continued.**NON-ALCOHOLIC DRINK ACT, 1909—Continued.**

artificially colored and flavored,	2
artificially flavored,	1
misbranded,	1
misbranded contained no raspberry juice,	1
Strawberry, adulterated,	1
artificially colored and flavored,	2
artificially flavored,	5
containing saccharin,	11
misbranded, containing no strawberry juice,	3

76**OLEOMARGARINE ACT, 1901, IN VIOLATION OF—**

Oleomargarine, colored sold as and for butter,	1
colored, sold without a license,	1
colored and served with meal,	1
colored and served in restaurant,	1
served in restaurant, no license,	2
served in boarding-house, no license,	1
served in hotel, no license,	2
sold as and for butter, no license,	1
sold at wholesale without a license,	1
sold at wholesale and peddling,	1
sold without a license,	4

16**RENOVATED BUTTER ACT, 1901, IN VIOLATION OF—**

Renovated butter, served without license,	2
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2**SAUSAGE ACT, 1901, IN VIOLATION OF—**

Sausage, adulterated,	1
containing added water,	5
containing vegetable flour and added water,	1
decomposed,	1
beef, as and for pork sausage,	1
fresh, containing added water,	1
bologna, containing cereals,	1
pork, containing excess of water,	1
containing cereals,	2
containing cereals and added water,	1
containing added water, cereal and sulphur dioxide,	2
decomposed,	1
fresh, containing added sulphites,	1
containing added water,	4
unfit for food,	1
Vienna style, containing vegetable flour and added water, ..	1

25**VINEGAR ACT, 1901, IN VIOLATION OF—**

Vinegar, adulterated,	6
Amber, distilled and colored,	1
Apple, adulterated with water,	1

CASES TERMINATED—Continued.

VINEGAR ACT, 1901, IN VIOLATION OF—Continued.

Brown, adulterated,	1
distilled and artificially colored,	2
Cider, acetic acid and water, colored with caramel, below standard in acidity,	1
acetic acid and water, colored, as and for cider vinegar, ..	1
adulterated,	32
containing added water,	19
containing distilled vinegar,	1
consisting of distilled vinegar colored with caramel,	3
consisting entirely of distilled vinegar,	1
mixture of cider and cider vinegar,	1
Distilled, artificially colored,	3
artificially colored and low in acetic acid,	1
artificially flavored as and for pineapple vinegar,	1
as and for cider vinegar,	3
as and for pineapple vinegar,	1
colored as and for pineapple vinegar,	2
as and for white wine vinegar,	2
below standard,	1
below standard in acetic acid,	1
colored as and for cider vinegar,	8
Pineapple, artificially flavored, misbranded and colored,	2
Red, Distilled and colored,	1
Rex amber, sugar vinegar for cider vinegar,	1
Syrup, as and for cider vinegar,	1
fermented as and for cider vinegar,	1
fermented, containing distilled vinegar,	1
White distilled vinegar below the standard,	1

101

Total number of cases terminated, 1,165

**RECEIPTS OF THE DAIRY AND FOOD BUREAU FROM
JANUARY 1st TO DECEMBER 31st, 1915, INCLUSIVE.**

Oleomargarine License Fees,	\$241,708 10
Milk Fines, Act of 1911,	14,218 35
Pure Food Fines,	6,945 60
Vinegar Fines,	3,712 90
Cold Storage License Fees,	3,650 00
Egg Fines,	1,675 00
Non-Alcoholic Drink Fines,	1,517 45
Sausage Fines,	1,340 60
Oleomargarine Fines,	1,120 00
Cold Storage Fines,	1,086 80
Ice Cream Fines,	960 00
Renovated Butter License Fees,	600 00
Lard Fines,	207 10
Renovated Butter Fines,	200 00
Fruit Syrup Fines,	63 50
Coffee and Chicory Fines,	50 00
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Total receipts for the year,	\$279,055 40

**AMOUNTS EXPENDED FROM THE APPROPRIATION FOR
THE MAINTENANCE OF THE WORK OF THE DAIRY AND
FOOD BUREAU OF THE PENNSYLVANIA DEPARTMENT OF
AGRICULTURE FOR THE YEAR 1915.**

Clerical and Stenographers,	\$8,551 50
Special Agents' Salaries,	26,127 50
Attorneys, Assistants and special,	9,714 39
Chemists' Services and Expenses,	18,459 25
Enforcing Cold Storage Law,	8,246 23
Traveling and Agents' Expenses,	14,802 49
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Total expenditures for the year,	\$85,901 36

OFFICE OF THE ATTORNEY GENERAL,

Harrisburg, Pa., February 3, 1916.

Hon. James Foust, Dairy and Food Commissioner, Harrisburg, Pa.:

Sir: Your favor of January 25, requesting an opinion of this Department as to whether a merchant holding a license to sell oleomargarine at retail, can take orders for the product in cities and towns other than the one designated in the license, and fill such orders by delivering the product by vehicle or otherwise, is at hand.

The oleomargarine law of May 29, 1901, which was amended by the Act of June 5, 1913, P. L. 412, provides in Section 1.

"That no person, firm, or corporation shall, by himself, herself, or themselves, or by his, her or their agent or servant, nor shall any officer, agent, servant or employee of any person, firm or corporation, manufacture, sell, ship, consign, offer for sale, expose for sale, or have in possession with intent to sell, oleomargarine unless such person, firm or corporation shall have first obtained a license and paid a license fee as hereinafter provided."

Section 2 provides, in part:

"That any person, firm, or corporation, and any agent of such person, firm or corporation, desiring to manufacture, sell or offer or expose for sale, or have in possession with intent to sell, oleomargarine, butterine, or any similar substance not made or colored so as to look like yellow butter, shall make application for a license so to do in such form as shall be prescribed which application, in addition to other matters which may be required to be stated therein by the said Dairy and Food Commissioner, shall contain an accurate description of the place where the proposed business is intended to be carried on if the said application is satisfactory to said Dairy and Food Commissioner he shall issue to the applicant or applicants a license authorizing him, her, or them to engage in the manufacture or sale of oleomargarine such license shall not authorize the manufacture, sale, exposing for sale or having in possession with intent to sell, oleomargarine, butterine, or any similar substance, at any other place than that designated in the application and license."

Strictly construing the second section just quoted, it would seem to require a license not only from every person, firm or corporation engaged in the sale or manufacture but also from every agent of such person, firm or corporation, but the language of the first section

indicates that when the license is obtained by a person, firm or corporation, such license shall authorize the agents, servants and employes thereof to manufacture and sell oleomargarine.

Under the provisions of this law it is clear that both the person and the place are licensed. It is also clear that oleomargarine could not be sold by an unauthorized person at an authorized place or by an authorized person at an unauthorized place. In order to bring the sale within the terms of the statute, it must be made by a person who has been licensed, through himself or his agent, and from a place which has been licensed. The license issued to a person, firm or corporation, does not authorize an itinerant business in oleomargarine. This act must be construed to carry out the Legislative intent. Manifestly one of the purposes of the Act was to have the oleomargarine business under the inspection and supervision of the Dairy and Food Commissioner. If a license were a roving commission to permit taking of orders in other cities and towns other than one designated in the license, it would make inspection or supervision by the Dairy and Food Commissioner extremely difficult.

If such a scheme could be followed, one person might take out one license for an entire county and transact his business by means of traveling agents taking orders therefor, or even extend such business into other counties.

It might be an unreasonable construction to hold that every clerk of a retail dealer who has a license to sell oleomargarine, must be also licensed because the act says that every agent of such person, firm or corporation desiring to manufacture, sell, offer or expose for sale, oleomargarine, shall make an application for a license so to do. Where a clerk or employee, in the regular course of his business is taking orders for other goods and along therewith, and as incident to such business takes orders for oleomargarine to be delivered with the other products, such transactions may fairly be covered by the retailer's license. On the other hand, it would be just as unreasonable, and do violence to the Legislative intent, to say that under this statute, a license to sell oleomargarine at retail, would permit the agents of the holder of the license to travel around into other cities and towns for the purpose of obtaining orders, even though the orders were to be filled by subsequent delivery from the place licensed. No such legislative intention can be gathered from this statute. The language is:

"Such licenses shall not authorize the manufacture or sale at any other place than that designated in the application and license."

To be more specific: If a retail merchant, who holds a retail oleomargarine license, has regular clerks taking orders for groceries, and orders for oleomargarine are taken along with other orders, by

such regular clerk or employee and the oleomargarine is marked and set apart and the name placed on each package, in the place licensed, and delivered as and when the other goods are delivered, such a transaction would be within the license of the retail dealer.

It may be that there are retail dealers in cities whose regular trade extends into outlying districts. In such instances sales made, as above indicated, on orders taken in such territory, would be within the license.

But I am of opinion that a license to sell oleomargarine at retail does not give the holder thereof the right to send agents and canvassers to take orders, especially for oleomargarine, into territory into which the business of such retailer would not ordinarily extend, particularly into other cities and towns in which there are other similar licenses.

Very truly yours,

Wm. M. HARGEST,
Deputy Attorney General.

OFFICE OF THE ATTORNEY GENERAL,

Harrisburg, Pa., November 19, 1915.

Hon. James Foust, Dairy and Food Commissioner, Harrisburg, Pa.:

Sir: Your favor of recent date was received. You propound the following question:

"If a box containing two or more dozen bottles of catsup, properly sealed and labeled in conformity with the National Food and Drugs Act of June 30, 1906, and shipped from another state to a retail merchant in Pennsylvania, is opened and the bottles placed upon the shelves of the store for sale, and upon purchase by an agent of this Department and on analysis, the catsup is found to violate the Pure Food Laws of this State, can the Pennsylvania laws be enforced?"

With your request you submit a copy of a letter of the State Food and Drug Commissioner of Indianapolis and an opinion of the Attorney General of Indiana, all to the effect that there can be no interference with a grocer who sells to his customer a single bottle of catsup, if it complies with the National Food and Drugs Act,

even though it violates the laws of the State, when such bottle of catsup was a part of a shipment from another state and originally packed in a larger case or box.

Your inquiry and the correspondence submitted are the result of a misconstruction of the case of *McDermott vs. Wisconsin*, 228 U. S. 115, 57 *Lawyers Edition* 754. The impression prevails since the opinion in that case, that a state cannot enforce its pure food laws against single, sealed packages of food misbranded or adulterated according to State laws, if such single packages comply with the provisions of the National Food and Drugs Act of June 30, 1906, (34 St. at Large, 768, Chapter 3915, U. S. Comp. Statt, Supp. 1911, page 1354). This impression is not justified by the decision itself. The precise questions in that case were,

First. Whether the word "package" as used in the Food and Drugs Act was limited to "original package" as understood in interstate commerce, or whether it included the goods upon the shelves of a local merchant for sale.

Second. Whether the Wisconsin law, which required the goods to contain the exclusive labels provided by that statute, and, in effect, prohibited the labels required under the National Food and Drugs Act, was beyond the power of the state to enforce.

The plaintiff in error, a retail merchant in Oregon, Wisconsin, was convicted of violating the Wisconsin statute because he had in his possession with intent to sell and offered for sale, "Karo Corn Syrup" which was not labeled according to the Wisconsin law providing that "the mixture or syrups designated in this section *shall have no other designation or brand than herein required,*" etc. He had purchased from wholesale grocers in Chicago twelve half gallon tin cans of Karo Corn Syrup, the shipments being made in wooden boxes containing the cans, and when the goods were received at the store, the cans were taken from the original boxes and placed on the shelves for sale, at retail. The cans were labeled in accordance with the National Pure Food and Drugs Act. That act provides, as stated in the opinion of *McDermott vs. Wisconsin*, page 130:

"And as to food, if it shall be labeled or branded so as to deceive or mislead a purchaser, or purport to be a foreign product when not so, or, if the contents of the *package* as originally put up shall have been removed in whole or in part, and other contents placed in such *package*; or, if the *package* fail to bear a statement of the label as required, or, if in *package* form and the contents are stated in terms of weight or measure, and they are not plainly and correctly stated on the outside of the *package*; or, if the *package* containing it or its label contain any design or device regarding the ingredients or the substances contained therein which are false or misleading in character, the food shall be deemed misbranded."

The Court, speaking through Mr. Justice Day, said:

"That the word 'package' or its equivalent expression, as used by Congress in sections 7 and 8 in defining what shall constitute adulteration and what shall constitute misbranding within the meaning of the act, clearly refers to the immediate container of the article which is intended for consumption by the public there can be no question. *And it is sufficient, for the decision of these cases, that we consider the extent of the word 'package' as thus used only, and we therefore have no occasion, and do not attempt, to decide what Congress included in the terms 'original unbroken package' as used in the second and tenth sections, and 'unbroken package' in the third section.*" Within the limitations of its right to regulate interstate commerce, Congress is manifestly aiming at the contents of the package as it shall reach the customer, for whose protection the act was primarily passed, and it is the branding upon the package which contains the article intended for consumption itself which is the subject matter of regulation. Limiting the requirements of the act as to adulteration and misbranding simply to the outside wrapping or box containing the packages intended to be purchased by the consumer, so that the importer, by removing and destroying such covering, could prevent the operation of the law on the imported article yet unsold, would render the act nugatory and its provision wholly inadequate to accomplish the purpose for which it was passed."

The Court also said, page 135:

"In the view, however, which we take of this case, it is unnecessary to enter upon any extended consideration of the nature and scope of the principles involved in determining what is an *original package*. For, as we have said, keeping within its Constitutional limitations of authority, Congress may determine for itself the character of the means necessary to make its purpose effectual in preventing the shipment in interstate commerce of articles of a harmful character, and to this end may provide the means of inspection, examination, and seizure necessary to enforce the prohibitions of the act."

And on page 136:

"To determine the time when an article passes out of interstate into state jurisdiction for the purpose of taxation is entirely different from deciding when an article which has violated a Federal prohibition becomes immune. The doctrine (of original package) was not intended to limit the right of Congress, now asserted, to keep the channels of interstate commerce free from the carriage of injurious or fraudulently branded articles, and to choose appropriate means to that end. The legislative means provided in the Federal law for its own enforcement may not be thwarted by state legislation having a direct effect to impair the effectual exercise of such means."

The Court held that Congress could employ the means to keep interstate commerce free from misbranded articles, even to an inspection on the shelves of a retail grocer after the goods had been removed from the "original package," as known in interstate commerce.

The Court also held that a State statute which interfered with such supervisory power over the avenues of commerce was an excessive and illegal exercise of the State's power.

This is the full extent to which the case of *McDermott vs. Wisconsin* goes.

There is no Pennsylvania pure food statute which excludes, or requires the obliteration of, any labels placed on foods under the United States Food and Drugs Act, nor is there any Pennsylvania statute which interferes with the inspection by the Federal authorities of goods either in original packages, or upon the shelves of retail merchants.

The precise question then, is whether a Pennsylvania statute may be enforced even if its provisions go farther than the Federal law, but do not interfere with the operation of the Federal statute.

Referring again to the much discussed case of *McDermott vs. Wisconsin*, it is seen that the Court was careful to say in terms that the regulations of Congress would not prevent enforcement of similar regulations by a state for the protection of its people.

Mr. Justice Day said, page 131:

"While these regulations are within the power of Congress, it by no means follows that the State is not permitted to make regulations, with a view to the protection of its people against fraud or imposition by impure food or drugs. This subject was fully considered by this court in *Savage v. Jones*, 225 U. S. 501, 56 L. Ed. 1182, 32 Sup. Ct. Rep. 715, in which the power of the state to make regulations concerning the same subject matter, reasonable in their terms, and not in conflict with the act of Congress, was recognized and stated, and certain regulations of the state of Indiana were held not to be inconsistent with the food and drugs act of Congress."

Again, on pages 133, 134:

"Conceding to the state the authority to make regulations consistent with the Federal law for the further protection of its citizens against impure and misbranded food and drugs, We think to permit such regulation as is embodied in this statute is to permit a state to discredit and burden legitimate Federal regulations of interstate commerce, to destroy rights arising out of the Federal statute which have accrued both to the government and the shipper, and to impair the effect of a Federal law which has been enacted under the Constitutional power of Congress over the subject."

The essence of the decision is found in these words, pages 132-134:

"To require the removal or destruction before the goods are sold of the evidence which Congress has by the food and drugs act, as we shall see, provided, may be examined to determine the compliance or non-compliance with the regulations of the Federal law, is beyond the power of the state. *The Wisconsin act which permits the sale of articles subject to the regulations of interstate commerce only upon condition that they contain the exclusive labels required by the statute is an act in excess of its legitimate power.*"

The question you propound is practically settled by the case of *Savage vs. Jones*, 225 U. S. 501, 56 L. Ed. 1182.

That was a suit to restrain the State chemist of Indiana from enforcing an act of that state relating to concentrated commercial feeding stuffs. It was alleged that the Indiana act which required certain labels to be affixed to the package, disclosing in part the ingredients and also required that certain stamps, purchased from the state chemist, should be attached as an inspection fee, interfered with interstate commerce and also because Congress had legislated upon the subject by the National Food and Drugs Act, its jurisdiction was exclusive, and therefore the Indiana Act could not be enforced as to packages received from outside the state and sold by the importing purchaser in the same packages.

The court held that the act was not an unconstitutional regulation of interstate commerce, and also, as stated in the syllabus in 56 Law. Ed. 1183, that:

"Congress did not by the passage of the Food and Drugs Act of June 30, 1906, for the prevention of adulteration and misbranding of foods and drugs when the subject of interstate commerce preclude the enactment of the Indiana Act prohibiting sales of concentrated commercial feeding stuffs in the *original packages*, unless there be a compliance as to inspection and analysis and the disclosure of ingredients * * * * * and with its incidental provision for the filing of a certificate, for registration, and for labels and stamps."

Mr. Justice Hughes, writing the opinion of the Court, said, page 524:

"The State cannot, under cover of exerting its police powers, undertake what amounts essentially to a regulation of interstate commerce, or impose a direct burden upon that commerce." (citing many authorities).

"*But when the local police regulation has real relation to the suitable protection of the people of the State, and is reasonable in its requirements, it is not invalid because it may incidentally affect interstate commerce, provided it does not conflict with legislation enacted by Congress pursuant to its constitutional authority.*" (Citing many authorities).

And on page 526, quoting from *Plumley vs. Mass.*, 155 U. S. 461, he said:

"Such legislation may, indeed, directly, or incidentally affect trade in such products transported from one state to another state. But that circumstance does not show that laws of the character alluded to are inconsistent with the power of Congress to regulate commerce among the several states."

Again, on page 529:

"The object of the food and drugs act is to prevent adulteration and misbranding, as therein defined. It prohibits the introduction into any state from any other state "of any article of food or drugs which is adulterated or misbranded, within the meaning of this act." The purpose is to keep such articles 'out of the channels of interstate commerce, or, if they enter such commerce, to condemn them while being transported or when they have reached their destinations, provided they remain unloaded, unsold, or in original unbroken packages.'"

And on page 532:

"Can it be said that Congress, nevertheless, has denied to the state, with respect to the feeding stuffs coming from another state and sold in the original packages, the power the state otherwise would have to prevent imposition upon the public by making a reasonable and non-discriminating provision for the disclosure of ingredients, and for inspection and analysis? If there be such denial it is not to be found in any express declaration to that effect. Undoubtedly Congress, by virtue of its paramount authority over interstate commerce, might have said that such goods should be free from the incidental effect of a state law enacted for these purposes. But it did not so declare."

In the case of *Simpson vs. Sheperd*, 230 U. S. 352, 57 L. Ed. 1511, the Court said:

"State inspection laws and statutes designed to safeguard the inhabitants of a state from fraud and imposition are valid when reasonable in their requirement, and not in conflict with Federal rules, although they may affect interstate commerce in their relation to articles prepared for export, or by including incidentally those brought into the state and held for sale in the original imported packages."

If the state can, as decided in *Savage vs. Jones*, require an additional label disclosing ingredients and also stamps covering cost of inspection to be attached to the original package, without unconstitutional interference with interstate commerce, or with the operation of the National Food and Drugs Act, it certainly can enforce its own laws when food in violation thereof is offered for sale by a citizen of the state to other citizens of the state, even though the food was imported from another state.

It is therefore clear that the pure food statutes of the State of Pennsylvania which do not interfere with the labeling provided by the National Food and Drugs Act, or with the inspection of the Federal authority under that act, do not even incidentally interfere with interstate commerce.

There is another consideration. The enforcement of the pure food laws of the State practically begins where the Federal control ends.

In the case of *McDermott vs. Wisconsin*, it is said in the opinion, page 136:

"To make the provisions of the act effectual, Congress has provided not only for the seizure of the goods while being actually transported in interstate commerce, but has also provided for such seizure after such transportation and while the goods remain 'unloaded, unsold or in original and unbroken packages.' The opportunity of inspection enroute may be very inadequate. The real opportunity of government inspection may only arise when, as in the present case, the goods as packed have been removed from the outside box in which they were shipped, and remain, as the act provides, 'unsold. It is enough, by the terms of the act, if the articles are unsold, whether in original packages or not."

The Pennsylvania statutes usually contain the language making it illegal to "sell, offer for sale, expose for sale or have in possession with intent to sell," any adulterated or misbranded article of food.

The Federal statute follows the goods from another State into Pennsylvania and on to the shelves of the retail merchant. When the goods get upon the shelves of the retail merchant the State inspection begins. There is no conflict of authority. The enforcement of Pennsylvania laws against goods on shelves of a retail merchant, is not even an incidental control of interstate commerce, nor is it any interference with Federal inspection.

I am aware that this opinion does not appear to be in harmony with the case of *Corn Products Refining Company vs. Weigle*, 221 *Federal Reporter*, 998, and the decree entered in that case which is before me, but not reported, certainly is not in harmony with this opinion, but there is no case in the United States Supreme Court which has gone to the length of the case just quoted, and, as I understand the decisions of that Court, the case of *Corn Products Refining Company vs. Weigle* has gone farther than any other case in that it completely ousts state inspection of goods that were once in interstate commerce, if such goods happen to be labeled in conformity with the National Food and Drugs Act, and prevents the operation of any state statute upon such goods, even as between a retail resident dealer and the resident consumer of the state. I cannot agree that the passage of the National Food and Drugs Act has such sweeping effect in destroying the police power of the state.

Therefore, specifically answering your inquiry, I am of opinion that after purchase and analysis of a bottle of catsup from the shelves of a store of a retail merchant in Pennsylvania, such catsup is found to violate the pure food laws of this State, such laws may be enforced even though the catsup has been shipped from another state and is sealed and labeled in conformity with the National Food and Drugs Act of June 30, 1906.

I return herewith the correspondence submitted with your request.

Very truly yours,

WM. M. HARGEST,
Deputy Attorney General.

IN THE COURT OF QUARTER SESSIONS OF BLAIR COUNTY.

COMMONWEALTH
vs.
J. A. KOLLER, *et al.*

}

In re. rule to show cause why portion of sample taken by the Commonwealth should not be turned over to defendant for analysis.

By the Court. So far as the rule for a bill of particulars is concerned, as ruled by the supreme court in Commonwealth v. Powell, 23 Sup. Ct. 372, a bill of particulars in a criminal case is not a matter of right, but is only an appeal to the sound discretion of the court. My recollection is that in some of the pure food indictments in cases tried in this court there was simply an allegation in the indictment that the pure food act had been violated, without specifying the particular violation. I am inclined to think that that indictment was perfectly good. We have our act of assembly which provides that an indictment shall be deemed sufficient which simply follows the words of the act of assembly, and if this indictment had simply followed the words of the act of assembly, and been in the general form with which we found other indictments we would feel it but right and proper that the Commonwealth should specify the particular article of food which was supposed to be adulterated, and at least specify in a general way how that particular article of food was adulterated; but in the present instance the particular article of food is specified, to wit, chocolate, and there is a general statement

as to how it is adulterated. I think we will all agree on a moments reflection that the rulings of the appellate courts on this subject are perfectly right and proper. The authority cited by Mr. Baldrige is not an analagous authority at all. In the first place, as stated by Mr. Woodward, the physical examination to which the plaintiff is compelled to subject himself is always made—and I am speaking only as to the orders of this court—is always in the presence of the physician of the plaintiff. I have drawn frequent orders compelling plaintiffs in damage cases to submit to physical examinations, but I was always careful to provide that the physician of the plaintiff should be present so that no unfair advantage could be taken of the plaintiff, and that everything that was done there was done in the presence of the physician of the plaintiff. But it seems to me that the endeavor to liken a civil proceeding to a criminal proceeding is fallacious, and that is the vice of the offer. In a civil proceeding the plaintiff may be compelled to subject himself to a physical examination. At the same time he has the mutual and co-ordinate right of compelling defendant to disclose his case. Not so in a criminal case. The defendant can hold all the papers in his possession, and there is no power to compel him to produce them. He can sit on the witness stand and say I have a paper at home, and the court is powerless to make him produce evidence to establish his guilt. That is one reason. In the second place a civil suit is tried on the weight of the evidence. Each party comes in with an equal right to be heard as to the measure of proof, but in a criminal suit the burden is on the Commonwealth to establish the case beyond a reasonable doubt and these maxims of ours about the reasonable doubt that the jury must come to the firm, unwavering conviction that the defendant is guilty, have come down to us from times when judges were wont to hang a man for stealing a loaf of bread. Now I do not say in the present criminal procedure that we should get away from those old maxims, but I do say that while we adhere to those old maxims, which were adopted when they hung men for stealing a loaf of bread, such maxims ought not to be applied against the Commonwealth on the one side and then on the other hand the Commonwealth be compelled to disclose all their case, and the absence of precedent to my mind is strong proof that there is not warrant for a court compelling the Commonwealth to submit their evidence in advance to the defendants. It does seem to me that the able criminal lawyers who have defended criminals charged with grave offenses if there was any warrant for such a precedent would have brought it in force. Take for instance a murder case. The Commonwealth claim that they found on the prisoner a bloody shirt, and that those blood stains are human blood, not chicken blood, or blood which he

received butchering a hog, but human blood; now we all know that the experts on the part of the defense coach the lawyers for the defense while they cross-examine the experts of the Commonwealth, but I do not think there would be any warrant for a defendant charged with murder to say you must tear that shirt in two, and you must give my chemists one half of the alleged blood stains so that they can prepare a defense; or, to put it more mildly, that they can have the alleged blood stains analyzed. I do not know of any such precedent, and the very fact that Mr. Baldridge, after diligent search, has been unable to find one to my mind is proof that there is no warrant to force the Commonwealth to produce the evidence they are going to submit. As I said before, in a civil suit, under certain equitable rules, each side must apprise the other side of what evidence they are going to use, but I do not think it would be fair to say to the Commonwealth you must give the defendant all your side of the case so that he can examine and ransack it, and at the same time allow the defendant to keep his mouth shut. It seems to me that would be giving a defendant an unfair advantage, and it seems to me it would be unfair to compel the Commonwealth to allow a defendant to subject their samples to examination in advance, and I will overrule the application for the compelling of the production of such samples. As to experiments in open court I do not know to what extent I will go about a matter of that kind. I did rule in the formaldehyde cases where Mr. Hicks wanted to take a drink of the preservative and wanted the court to take a drink of it, and let the jury take a drink of it, I did rule that he could take a drink, but the court would not, and would not have the jury do so. Mr. Hicks was going to turn the court into a laboratory, and I think we said we would not have any laboratory here in court. I do not know to what extent I would go if there was an effort on the part of the defendant to examine samples by microscopic tests,—I will leave that matter open.

I hereby certify that I am the Official Stenographer to the Courts of Blair County, Pa., and that as such official stenographer I attended at the trial of Commonwealth vs. J. A. Koller et al., No. ——— October Sessions, 1904, and took full stenographic notes of all the proceedings of said trial, and that the foregoing opinion is a full and correct transcript from my original stenographic notes so taken as aforesaid.

J. F. MECK,
Official Stenographer.

Hollidaysburg, Pa., April 12, 1905.

IN THE COURT OF QUARTER SESSIONS OF BLAIR COUNTY.

COMMONWEALTH	}	October Sessions, 1904.
vs.		
J. A. KOLLER, <i>et al.</i>		

In re. rule to show cause why Commonwealth should not place in the hands of defendants a portion of sample for analysis by defendants, and for bill of particulars.

Argument of Mr. Woodward, Counsel for Commonwealth.

I think it will be conceded that the proposition as made on the part of the defense in this case is entirely novel. I listened with a great deal of interest to the argument on the part of defendant to discover any precedent for an application of this kind, and I fail to find that counsel, with all his diligence, has produced any authorities to justify them in making such an order. This application is two fold; but the two different features are very closely related. In the first place it is that the Commonwealth be compelled by the Court to place in the hands of the defendant here, charged with a crime, the evidence now in the possession of the Commonwealth, and to place in their hands the sample of food products which have been taken and which are supposed to be in the possession of the Commonwealth—whether they are or not does not appear in the case. A bill of particulars is the second application. We have to say in reference to the bill of particulars that the application is entirely novel in this respect: a bill of particulars in Pennsylvania, under our criminal law, can never be required in advance of an indictment. The indictment is the bill of particulars. By reason of the generality of the informations,—and that arises by reason of the fact that informations are very frequently drawn by persons unskilled—the law requires before any man shall be placed on trial that there shall be a specification of the matter set forth in the form of an indictment which is in itself a bill of particulars. Now it is a little novel in advance of an indictment that defendant could come into court merely on an information that he had been arrested, and there was no issue before the court, and ask for a bill of particulars. The indictment corresponds with the declaration in a civil suit, and until an indictment is found just as in a civil suit until declaration is filed, defendant is not in jeopardy and cannot be called upon to plead, and can at that time object to the information, unless the information upon its

face fails to disclose a crime. All that is necessary is to show that a crime has been committed. There is no allegation in this case that the indictment is not in the usual form, or that it does not specify any crime to have been committed, or does not come within the Act of Assembly as well as within our precedents in reference to form of indictments. Nor is there any reason that by reason of generality the defendant is liable to be surprised by reason of the evidence of the Commonwealth.

We come to the second proposition: That the Commonwealth be compelled to furnish a sample, or portion of the sample in their possession, that a part of the evidence, the property of the Commonwealth, be placed in the hands of men here charged with a crime. We say this is an unheard of proposition in Pennsylvania. A parallel case would be if they would come in a criminal court and ask the Commonwealth to furnish the defendant with a list of her witnesses, with the right to examine those witnesses before the court, or to specify in advance of the trial of the case exactly what evidence was to be produced. We say in the first place that a bill of particulars such as this would be is not a matter of right; it is a question that appeals to the discretion of the court entirely, and it will only be granted in such cases where defendant's rights are liable to be jeopardized by reason of the generality of the charge, that they shall furnish specifications in relation to this crime. They are not entitled to it in Pennsylvania, and there is no decision that will give them that kind of authority. We have some decisions on the general proposition. The first on the question of bill of particulars is *Commonwealth v. Powell*, 23 Sup. Ct. 370, etc., (reading same). I refer to the case of *Commonwealth v. Buccieri*, 163 Pa. 535 (and reads from same). We also refer to the case of *Commonwealth v. Applegate*, 1 District Reports 127 (reciting facts, etc.).

We had an application somewhat similar to this in Centre County for a bill of particulars, and upon this same question it was refused in an opinion which I have here.

Counsel has cited a case here from the civil courts in reference to the examination of people who are alleged to have suffered from some accident, and cites that as a parallel case. That is not a parallel case for this reason: While the court may in the exercise of its discretion compel the plaintiff seeking damages after an accident that may occur to him, while he may compel the defendant in court, and in the presence of the other side, with their expert witnesses present, that is the only rule I know of adopted in the Commonwealth of Pennsylvania, to submit himself to an examination; yet I think he will not find a case in which the plaintiff is compelled

in advance of court, out of court, and away from his own parties and his own physician to submit himself to an examination. Now this application is not made to compel the examination in the presence of the experts on one side and the other, but the application is that the defendant is to have this sample handed over wholesale to the defendant, and we say this is without merit, and the Commonwealth is not bound to do it.



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COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF AGRICULTURE

BUREAU OF CHEMISTRY

BULLETIN NO. 280

Feeding Stuffs Report

1915

JAMES W. KELLOGG,

Chief Chemist



Published by Direction of the Secretary of Agriculture,
CHARLES E. PATTON

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER.
1916

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LETTER OF TRANSMITTAL

DEPARTMENT OF AGRICULTURE BUREAU OF CHEMISTRY

Harrisburg, Pa., April 20, '916.

Hon. Charles E. Patton,
Secretary of Agriculture,
Harrisburg, Pa.

Dear Sir: I have the honor to submit herewith for your approval a report of the work performed by the Bureau of Chemistry during 1915, incident to the enforcement of the provisions of the Law regulating the sale of Concentrated Commercial Feeding Stuffs. The information included shows the results of the chemical analyses and microscopical examinations of the samples secured and other data pertaining to the work.

It is recommended that this report be published in bulletin form for distribution.

Very respectfully,

JAMES W. KELLOGG,
Chief Chemist.



FEEDING STUFFS REPORT

1915

JAMES W. KELLOGG*

INTRODUCTION

The data presented herewith as the "Feeding Stuffs Report for 1915" shows the work performed during the year by the Bureau of Chemistry under the direction of the Secretary of Agriculture in carrying out the provisions of the law regulating the sale of Feeding Stuffs. In order to determine whether or not the various brands and kinds of feeds being sold in Pennsylvania were properly and correctly labeled and guaranteed as required, Special Agents of the Department secured samples for analysis of the Feeds being sold by Dealers throughout the State in accordance with the usual method of enforcing control laws. During the year 293 towns and cities in 48 counties were visited and 1,264 samples obtained and sent to the Bureau of Chemistry to be analyzed and examined microscopically. A number of towns and counties were visited in which no samples were taken in order to avoid duplication of work as the shipments examined by the Special Agents appeared to be properly labeled and also as samples representing such feeds had already been obtained in nearby localities. A portion of feed was drawn from at least 4 sacks of each kind or brand of feeding stuff as required, carefully mixed and 2 glass bottles filled and sealed, one being left with the Dealer for reference or analysis, the other being sent to the Department. Each sample received was analyzed for moisture, protein, fat and fiber and examined microscopically to determine its charac-

*Assisted by Victor B. Hausknecht, Howard E. Gensler, J. Edgar Shull and W. Earl Huber. The microscopical work herein reported was performed by Mr. Gensler.

ter and composition. The Special Agents also submitted a report covering each sample showing the brand name or kind of feed represented, the guarantees given, the method of labeling and the retail price at which they were being offered for sale. Reports including this information together with the results of analysis of each sample were made to the Secretary of Agriculture from time to time as the analytical work was completed. Similar reports were also sent to each Dealer from whom the samples were obtained and to the Manufacturers or Importers responsible for their production with comments where necessary with respect to labeling or guaranteeing.

Judging from the samples examined, the character of the feeding stuffs which were sold in Pennsylvania during 1915 was normal although there is room for improvement in a number of brands. An improvement in the method of stating guarantees was noted over the condition observed during previous years in certain classes of feeds, although there was a slight increase in the number of deficiencies where the protein was 1.00 per cent. or more and the fat one-half of 1.00 per cent. or more below the minimum guarantees. The larger proportion of the deficiencies occurred in the cotton-seed meals, molasses dairy feeds and poultry foods, and the greatest number of variations noted, where the list of ingredients identified by microscopical examinations as compared with those claimed, was in the case of the poultry foods. Of the total number of proprietary and miscellaneous mixed feeds numbering 778, 32.52 per cent. of the samples examined showed a variation in the ingredients found as compared with those claimed. The presence of traces and small amounts of whole weed seeds was noted in 33 samples of the molasses dairy feeds and in 94 samples of the poultry foods. In 19 samples of the latter class of foods, whole weed seeds occurred in large amounts indicating that the poultry foods are not as clean in this respect as they should be. From this data it is plainly evident there is need for improvement and more care in stating properly the list of ingredients in mixed feeds as well as freeing these feeds from weed seeds. In a number of samples of molasses horse, stock and mule feeds, the content of moisture appeared excessive running as high as 20 per cent.

A large number of the feeds sold in the State were guaranteed with "sliding guarantees" or with minimum and maximum guarantees for protein, fat and fiber, which, in many cases, ranged several per cent. between the lower and higher figures. The results of the analysis of the samples received showed that the higher guarantees were not, as a rule, maintained and, therefore, it is also evident that this method of guaranteeing is unsatisfactory. The Department has taken the position that "sliding guarantees" are false and mislead-

ing and contrary to the requirements of the feeding stuffs law and accordingly has issued notices to the trade to this effect. It is hoped that in the future only single and correct guarantees will be used thus more truly indicating what the feeds will run upon analysis.

During the year covered by this report there were 523 registrations for feeding stuffs received from Manufacturers and Importers including 2,056 brands and kinds of feeds being sold in the State. Of this number of feeds, 1,353 were those having proprietary or distinctive brand names and the remaining number included for the most part well known by-products feeds not having distinctive brand names. Registrations were also received from a number of Dealers listing feeds already or subsequently listed in registrations submitted by the original producers. The names of these Manufacturers and Importers together with the names and brands of the feeds registered are included in this report.

The number of special samples sent to the Department for analysis by Manufacturers, Importers, Dealers and Purchasers located in the State was 225. These samples were usually submitted for the purpose of determining whether or not they would, upon analysis, meet the guarantees claimed and also to determine what new feeds would analyze, and how they should be labeled when they were offered for sale. As soon as possible after the completion of the work, reports were submitted to the Senders together with the receipt for the fee of \$1.00 which is charged and in many cases replies were made to inquiries concerning these samples with respect to how they should be guaranteed and labeled for ingredients. In a number of cases also examinations were made to determine whether or not the samples submitted contained possible adulterants or prohibited materials.

The detailed results of the years work will be found in the following pages and include a list of the registered feeds, comments concerning the various brands and kinds represented and tables showing the number of counties visited and samples secured in each, classification of samples and deficiencies, average analysis and retail prices, average composition of feeding stuffs and their digestion co-efficients and therms of energy and the results of analysis and microscopic examinations of the official samples of feeds received during the year.

ACKNOWLEDGEMENTS

Acknowledgement is herewith made to the Secretary of Agriculture, Hon. Charles E. Patton, the General Agent, Mr. G. G. Hutchison, the Special Agents and to each member of the Bureau Staff whose help, advice and co-operation has made possible the completion of the years work. Those responsible for conducting the work of the Bureau are greatly indebted to Hon. N. B. Critchfield, who for over 12 years, as Secretary of Agriculture, has done so much for "better feeds" in Pennsylvania and whose kindly advice and valuable help has contributed in no small measure to the success of the work of the Department of Agriculture and many thanks are extended to him. Our thanks are also proffered to Manufacturers, Importers and Dealers of feeding stuffs, to the Feed Manufacturers' Association and to the Trade Journals who have shown a splendid co-operation with the Department in carrying forward and making progress in the feeding stuffs control work.

DEFINITIONS

In previous Feeding Stuff Reports a complete list of the definitions which had been adopted from time to time by the Association of Feed Control Officials have been included. At the 1915 meeting of this Association, additional definitions were adopted for two products namely; "Ingredients of Unscreened Flaxseed Oil Feed" and "Screenings Oil Feed" also tentative definitions were agreed to for 9 products being used for feeding purposes which are included in this report as follows:

INGREDIENTS OF UNSCREENED FLAXSEED OIL FEED:
Ground cake from partially extracted flaxseed and foreign seeds (wheat, wild buckwheat, pigeon grass, wild mustard, etc.).

SCREENINGS OIL FEED is the ground product obtained after extraction of part of the oil by crushing, cooking and hydraulic pressure, or by crushing, heating and the use of solvents from the smaller imperfect grains, weed seeds and other foreign materials having

feeding value separated in cleaning the grain. The name of the grain from which the screenings are separated shall be prefixed to "screenings oil feed."

YEAST OR VINEGAR, DRIED GRAINS are the properly dried residue from the mixture of cereals, malt and malt sprouts (sometimes cottonseed meal) obtained in the manufacture of yeast or vinegar, and consist of corn or corn and rye from which most of the starch has been extracted, together with malt added during the manufacturing process to change the starch to sugars, and malt sprouts (sometimes cottonseed meal) added during the manufacturing process to aid in filtering the residue from the wort and serve as a source of food supply for the yeast.

OIL CAKE is the residual cake obtained after extraction of part of the oil by crushing, cooking and hydraulic pressure from seeds screened and cleaned of weed seeds and other foreign materials by the most improved commercial processes. When used alone the term "oil cake" shall be understood to designate the product obtained from partially extracted, screened and cleaned flaxseed. When used to cover any other product, the name of the seed from which it is obtained shall be prefixed to "oil cake."

GROUND OIL CAKE is the product obtained by grinding oil cake. When used alone, the term "ground oil cake" shall be understood to designate the product obtained from partially extracted, screened and cleaned flaxseed. When used to cover any other product the name of the seed from which it is obtained shall be prefixed to "ground oil cake."

GROUND FLAXSEED OR FLAXSEED MEAL is the product obtained by grinding flaxseed which has been screened and cleaned of weed seeds and other foreign material by the most improved commercial processes.

PALM KERNAL OIL MEAL is the ground residue from the extraction of part of the oil by pressure or solvents from the kernel of the fruit of the *Elaeis guineensis* or *Elaeis malanococca*.

IVORY NUT MEAL is ground ivory nuts.

PEANUT OIL CAKE is the residue after the extraction of part of the oil by pressure or solvents from peanut kernels.

PEANUT OIL MEAL is the ground residue after the extraction of part of the oil from peanut kernels.

UNHULLED PEANUT OIL FEED is the ground residue obtained after extraction of part of the oil from whole peanuts, and the ingredients shall be designated as "peanut meal and hulls."

FEEDING STUFFS REGISTRATIONS

A list of the Manufacturers or Importers of feeding stuffs and the names or brand names of the feeds registered with the Department, heretofore has not been published. As there have been a great many requests for this information and as a list of the registered feeds will enable Dealers and Consumers to have this data before them for ready reference, it seems desirable that a list of the registered feeds be included as a part of the feeding stuffs report. In many cases, registrations were received from Importers, Distributors or Dealers listing proprietary feeds or feeds having distinct brand names, which had been already or subsequently registered by the original Manufacturers. In these cases the names of the feeds are not shown under the names of those submitting such registrations but are included under the names of the Manufacturers responsible for their production. In a number of cases dealers submitted a list of feeds, which had been already or subsequently registered by the Manufacturers and in such cases, to avoid duplications, the names of these Dealers are not included. In the absence of distinctive or proprietary names, it is impossible to include feeds so listed under the proper Manufacturers' names which, of course, occasions many duplications but, under the circumstances, these duplications cannot be avoided. For example, many Importers or Distributors submitted registrations listing "Cottonseed Meal," "Alfalfa Meal," "Wheat Bran," "Wheat Middlings," "Gluten Feed," "Hominy Feed," etc., which are produced in a number of cases, by Manufacturers, whose names are not shown and which were, no doubt, registered by the original producers. From the experience gained in receiving and filing registrations, it seems highly desirable, therefore, for Manufacturers to adopt distinctive brand names for their products, especially if they wish to have such feeds known to the Dealers as representing their firm's out-put. If this method were uniformly adopted much confusion would be avoided. As an illustration, there are a number of "Dry Mash" feeds on the market where the Manufacturers' names, which appear on the sacks or attached cards, are lost sight of, while a distinctive brand name such as "Keystone Dry Mash" becomes well known and by becoming well known, as a rule, indicates or carries with it the name of the Manufacturer.

During the year, covered by this report, there were received from Manufacturers and Importers, as well as a number of Dealers, 523 registrations each including one or more kinds or brands of feed making a total of 2,056 feeding stuffs, which were registered. Of this number, 1,353 were proprietary brands of feeds, which had been given distinctive brand names. They included, for the most part, the well known mixed feeds and many by-product feeds having proprietary names such as oil cake meals and wheat and rye offals. The 703 remaining feeds, not classed as proprietary feeds, included whole grain poultry foods, a few mixed dairy and horse feeds, oil cake meals, alfalfa meals and wheat, rye, oat, buckwheat and maize by-products. While, as already stated, there may be a few duplications, because of the absence of distinctive brand names, it is believed a list of the registered feeds, together with the names of the producers, will be of interest to the trade. The feeds registered during the year, therefore, are listed under the names of the Manufacturers or Importers in alphabetical order as follows:

FEEDING STUFFS REGISTERED FOR 1915.

Acme Milling Co., Olean, N. Y.

Acme Dry Mash,
Acme Feed,
Wheat Bran,
Wheat Middlings.

The Aetna Mills Co., Wellington Kans.

Mill Run Bran,
Wheat Bran,
Wheat Shorts,
White Shorts.

Acme-Evans Co., Indianapolis, Ind.

Acme Bran,
Acme Middlings,
Acme Cracked Corn,
Acme Chick Feed,
Acme Cream Feed,
Acme Feed,
Acme Feed Meal,
Acme Scratch,
Acme Scratch Feed,
Acme Stock Feed,
E. Z. Chick Feed,
E. Z. Chop Feed,
E. Z. Scratch Feed.

Acme Manufacturing Co., Wheaton, Ill.

Acme Calf Meal,
Acme Pig Meal.

The Akron Feed & Milling Co., Akron, Ohio.

O. O. B. Stock Feed,
Portage Corn and Oats Chop,
Portage Scratch Feed,
Portage Scratch Feed with Grit,
Portage Stock Feed,
Portage Yellow Feed Meal,
Yellow Hominy Feed.

Alfocorn Milling Co., East St. Louis, Ill.
 Alfocorn Dairy Feed,
 Alfocorn Hen Feed,
 Alfocorn Horse and Mule Feed,
 Corn and Oats Chops,
 Diamond "D" Hen Feed,
 Diamond "D" Horse and Mule Feed,
 Leader Horse and Mule Feed,
 Molasses Alfocorn Horse and Mule Feed,
 Sweet Meal.

Winfield S. Allen.
 Ground Beef Scraps,

The Allen & Wheeler Co., Troy, Ohio.
 Trojan Bran,
 Trojan Chop Feed,
 Trojan Corn and Oats Feed,
 Trojan Cracked Corn,
 Trojan Feed Meal,
 Trojan Middlings,
 Trojan Mixed Feed.

Gustave Altman, Jr., Alexandria, Pa.
 Pure Corn Chop,
 Pure Corn and Oats Chop,
 Pure Wheat Bran and Shorts.

Amendt Milling Co., Monroe, Mich.
 Amco No. 2 Chop Feed,
 Amco Scratch Feed with Grit,
 Amco Scratch Feed without Grit.

The American Agricultural Chemical Co., New York, N. Y.
 Ground Meat Scraps,
 Pure Ground Meat Scraps.

American Hominy Co., Indianapolis, Ind.
 Cerealine Feed,
 Cracked Corn (chick size),
 Cracked Corn (not screened),
 Cracked Corn and Rolled Oats,
 Homco Chick Feed,
 Homco Dairy Feed,
 Homco Dry Mash,
 Homco Feed,
 Homco Horse Feed,
 Homcoline Feed,
 Homco Scratch Feed with Grit,
 Homco Scratch Feed,
 Homco Superior Horse Feed,
 Homco Superior Scratch Feed,
 Maizeline Feed,
 Pennsylvania Star Feed,
 Special Horse Feed.

American Linseed Co., New York, N. Y.
 Cleveland Flaxmeal,
 Hypro Pure Linseed Meal,
 Old Process Oil Meal.

American Maize Products Co., New York, N. Y.
 Cream of Corn Gluten Feed.

American Malting Co., New York, N. Y.
 Number One Malt Sprouts,
 Standard Malt Sprouts,
 Hully Malt Sprouts.

American Milling Co., Peoria, Ill.
 Amco Alfalfa Molasses Feed,
 Amco Fat Maker,
 Amco Old Process Linseed Meal,
 Cluck Cluck Scratch Feed,
 Cluck Cluck Scratch Feed with 5% Grit,
 Sucrene Calf Meal,
 Sucrene Chick Feed,
 Sucrene Chick Feed with 5% Grit,
 Sucrene Dairy Food,
 Sucrene Hog Meal,

American Milling Co.—Continued.

Sucrene Horse and Mule Feed,
 Sucrene Horse Feed (With Alfalfa),
 Sucrene Poultry Mash,
 Sucrene Scratch Feed,
 Sucrene Scratch Feed with 5% Grit,
 Tip Top Sugared Feed.

American Remedy Co., Greencastle, Pa.

Arco Egg Getter,
 Arco Stock Tonic and Conditioner.

American Sheet & Tin Plate Co., Pittsburgh, Pa.

Refuse Cleaning Mixture.

Ames-Burns Co., Jamestown, N. Y.

A. B. C. Fine White Hominy Meal,
 Perfection Fancy Winter Bran, with ground Screenings not exceeding mill run
 Perfection Fancy Winter Middlings, with ground screenings not exceeding mill run.

Anderson Brothers & Co., York, Pa.

A. B. C. Chick Feed,
 A. B. C. Scratch Feed,
 Hen-O-La Chick Feed,
 Hen-O-La Mash Feed,
 Hen-O-La Scratch Feed,
 Must Lay Mash Feed.

The Angelo Myers Distillery, Inc., Linfield, Pa.

Linfield Feed (Dried Rye Grains).

Anheuser-Bush Brewing Association, St. Louis, Mo.

Brewers Dried Grains,
 Malt sprouts No. 1,
 Malt sprouts No. 2.

The Animal Products Co., Philadelphia, Pa.

Apco Poultry Meat.

The Ansted & Burk Co., Springfield, Ohio.

William Tell Bran
 William Tell Middlings,
 William Tell Mixed Feed.

Arcady Farms Milling Co., Rondout, Ill.

Arcady Calf Meal.
 Arcady Certified Dairy Feed,
 Arcady Dairy Feed,
 Arcady Horse Feed.

Archer-Daniels Linseed Co., Minneapolis, Minn.

Old Process Ground Linseed Cake.

Armour Fertilizer Works, Chicago, Ill.

Armour's Blood Meal,
 Armour's Granulated Bone,
 Armour's Meat Meal.

Ashland Stock Food Co., Ashland, Ohio.

Ashland Poultry Food Digester,
 Ashland Stock Food Digester.

Atlantic Export Co., New York, N. Y.

Doctor Spund Dried Brewers Grains.

Atlas Flour Mills Co., Milwaukee, Wis.

Atlas Reddog,
 Atlas Wheat Bran with Ground Screenings Not Exceeding Mill Run,
 Atlas Wheat Flour Middlings with Ground Screenings not Exceeding Mill Run.
 Standard Wheat Middlings with Ground Screenings Not Exceeding Mill Run.

E. L. Auman Milling Co., Millheim, Pa.

Brewers Grains.

Aunt Jemima Mills, St. Joseph, Mo.

Davisko White Shorts,
 Mill Run & Wheat Screenings (Screenings Not Exceeding Mill Run),
 Standard Wheat Shorts,
 Wheat Bran & Wheat Screenings Not Exceeding Mill Run,
 White Hominy Feed,
 Yellow Corn Chop.

- H. O. Ayer, Ulster, Pa.
Beef Scrap,
Fish Scrap.
- J. J. Badenoch Co., Chicago, Ill.
Badenochs' C. & O. Chop Fine,
C-ER-Lay Fine Chick with Grit,
C-ER-Lay Poultry Feed no Grit,
C-ER-Lay Poultry Feed with Grit,
EG-A-Day Meat Cereal Mash,
Gloskoat Horse Feed,
Kumboss Dairy Feed,
Kurvnek Horse Feed,
Sunflower Dev. Feed no Grit,
Sunflower Dev. Feed with Grit,
Sunflower Fine Chick no Grit,
Sunflower Fine Chick With Grit,
Sunflower Pigeon Feed No Grit,
Sunflower Pigeon Feed With Grit,
Sunflower Poultry Feed No Grit,
Sunflower Poultry Feed With Grit.
- E. I. Bailey, Cleveland, Ohio.
Pearl Hominy Feed.
- Baldwin Flour Mills, Minneapolis, Minn.
Baldwin Wheat Bran with not exceeding Mill Run of Ground Screenings,
Baldwin Wheat Shorts with not exceeding Mill Run of Ground Screenings,
Baldwin Wheat Fl. Middlings not exceeding Mill Run of Ground Screenings,
Baldwin Wheat Red Dog with not exceeding Mill Run of Ground Screenings.
- P. Ballantine & Sons, Newark, N. J.
Malt Screenings.
- Ballard & Ballard Company, Louisville, Ky.
Ballard's Bran,
Ballard's Kentucky Farm Feed,
Ballard's Mixed Wheat Feed.
- Baltic Mills, Vincennes, Ind.
Hominy Feed.
- Banner Milling Co., Buffalo, N. Y.
Banner Bran,
Banner Flour Midds,
Banner Mixed Feeds,
Banner Standard Midds.
- Barber Milling Company, Minneapolis, Minn.
Pure Wheat Bran Flakes,
Pure Wheat Low Grade,
Pure Wheat Middlings,
Pure Wheat White Middlings,
Pure Wheat White Satin Mixed Feed.
- M. F. Baringer, Philadelphia, Pa.
Atlantic Dried Grains,
Copra Cake Meal,
Corn Bran,
Dried Brewers Grains,
Malt Sprouts,
Hominy Feed,
M. E. B. Prime Cottonseed Meal.
- Bartholomay Brewery Co., Rochester, N. Y.
Dried Brewers Grains,
Malt Sprouts.
- C. D. Bartholomew, Centre Hall, Pa.
Centre Hall Scratch Feed.
- J. E. Bartlett Co., Jackson, Mich.
Michigan Farmer Brand Cottonseed Meal,
Malt Sugar Grains Dairy Feed.
- Baugh & Sons Company, Philadelphia, Pa.
Baugh's Meat Meal for Poultry,
Baugh's Special Ground Bone for Poultry.

Bay State Milling Co., Winona, Minn.
 Reddog Flour,
 Rye Middlings,
 Winona Coarse Wheat Bran,
 Winona Fancy Mixed Wheat Feed and Wheat Screenings,

Beck Cereal Company, Detroit Mich.
 Royal Chop Feed.

G. D. Benn, Coalport, Pa.
 Pure Corn Chop,
 Pure Corn and Oats Chop,
 Pure Rye Chop,
 Pure Rye and Oats,
 Wheat Bran,
 Wheat Middlings.

The Berg Company, Philadelphia, Pa.
 Berg's 3 Medal Poultry Meat.

Bernet, Craft & Kauffman Mfg. Co., Mt. Carmel, Ill.
 Middlings,
 Mt. Carmel Bran,
 Mixed Feed (Bran & Midds).

T. M. Biddle, Altoona, Pa.
 Acme Horse Chop,
 Crescent Corn and Oats Chop,
 Eclipse Poultry Food,
 Eclipse Breakfast Food,
 Gem Middlings,
 Gilt-Edge Corn Chop,
 My Best Horse Feed.

Big Diamond Mills Company, Minneapolis, Minn.
 Big Diamond Bran,
 Big Diamond Flour Midds,
 Big Diamond Mixed Feed.
 Big Diamond Standard Midds.

Big Four Milling Co., Cleveland, Ohio.
 Dandy Chop Feed,
 Co-Boss Dairy Feed,
 Ecota Horse Feed,
 Egg-A-Day Scratch Feed,
 Four A Horse Feed,
 Four A Dairy Feed,
 Fourota Alfalfa Meal,
 Fourota Chick Feed,
 Fourota Growing Feed,
 Fourota Horse & Mule Feed,
 Fourota Scratch Feed.

The Birkett Mills, Penn Yan, N. Y.
 A Chop.
 Buckwheat Offal Feed,
 Corn Meal,
 Cracked Corn,
 Hominy Meal,
 Victrix Egg Mash,
 Wheat Bran,
 Wheat Middlings.

Blaine MacKay Lee Company, North East, Pa.
 Pure Wheat Bran and Ground Screenings,
 Pure Wheat Middlings.

Blamberg Bros. Inc., Baltimore, Md.
 Cornell Brand Beef Scraps,
 Cornell Brand Chick Feed,
 Cornell Brand Developing Mash,
 Cornell Brand Dry Mash,
 Cornell Brand Meat Meal,
 Cornell Brand Scratch Feed,
 Cornell Brand Snow White Chick Feed,
 Cornell Brand Snow White Scratch Feed,
 Cornell Brand Special Beef Scraps,

Blamburg Bros., Inc.—Continued.

Cornell Brand No. 1 Pigeon Feed,
 Cornell Brand No. 2 Pigeon Feed,
 Cornell Brand No. 3 Pigeon Feed.
 Cornell Brand No. 4 Pigeon Feed.
 Exlnt Brand Dry Mash.

Blank & Gottshall, Sunbury, Pa.

B. & G. Chick Food,
 B. & G. Chick Mash Food,
 B. & G. Dair Food (C),
 B. & G. Developing Food,
 B. & G. Hen Food,
 B. & G. Horse Food,
 B. & G. Mash Food,
 B. & G. Pigeon Food,
 B. & G. No. 2 Chick Food,
 B. & G. No. 2 Hen Food,
 B. & G. Hen-O-La Chick Food,
 B. & G. Hen-O-La Mash Food,
 B. & G. Hen-O-La Scratch Food.
 B. & G.'s Baby Chick Feed.

Blatchford Calf Meal Factory, Waukegan, Ill.

Blatchford's Calf Meal,
 Blatchford's Egg Mash,
 Blatchford's Fill the Basket Egg Mash,
 Blatchford's Milk Mash,
 Blatchford's Pig Meal
 Blatchford's Sugar and Flaxseed.

Blish Milling Company, Seymour, Indiana.

Blish's Bull's Eye Mixed Feed.

J. Bolgiano & Son, Baltimore, Md.

Square Deal Chick Food,
 Square Deal Chick Starter,
 Square Deal Beef Scraps for Poultry,
 Square Deal Pigeon Food,
 Square Deal Poultry Food.

Bolivar Milling Co., Inc., Bolivar, N. Y.

Corn Meal,
 Corn & Oats Chop,
 Cracked Corn.

Rowen & Murphy, Birmingham, Ala.

Cotton Seed Meal.

Bowker's Fertilizer Co., New York City.

Bowker's Animal Meal.

F. W. Brode & Co., Memphis, Tenn.

Owl Brand Cottonseed Meal.

The Brown Co., Trenton, N. J.

Capital Meat Scraps.

The Buckeye Cereal Co., Massillon, Ohio.

Bar X Dairy Feed,
 Buckeye Chop,
 Buckeye Scratch Feed,
 Energy Horse Feed,
 Hominy Feed Meal,
 Malto Dairy Feed,
 Sweet Moselle,
 Sweet Moselle Horse & Mule Feed.

The Buckeye Cotton Oil Co., Cincinnati, Ohio.

Buckeye Prime Cottonseed Meal.

Buffalo Cereal Co., Buffalo, N. Y.

"B" Corn Meal,
 Bufceco Chick Feed,
 Bufceco Chop Feed,
 Bufceco Creamery Feed,
 Bufceco Dairy Feed,
 Bufceco Hominy Feed,
 Bufceco Horse Feed,
 Bufceco Intermediate Scratching Grains,

Buffalo Cereal Co.—Continued.

Bufaceco Pigeon Feed,
 Bufaceco Poultry Mash,
 Bufaceco Scratching Grains,
 Bufaceco Steam Cooked Feed,
 Bufaceco Stock Feed,
 Iroquois Chick Feed,
 Iroquois Chop Feed,
 Iroquois Poultry Mash,
 Iroquois Scratching Grains,
 Mohawk Corn Meal,
 Seneca Corn Meal.

John R. Burkholder, Lancaster, Pa.
 Bovineeda,
 Oat Offal.

Bushkill Milling Co., Easton, Pa.
 Clear Grain Chick Food,
 Clear Grain Scratch Food.
 Dry Mash for Poultry,
 "Mix" Feed,
 Old Process Oil Meal.

W. J. Byrnes & Co., Chicago, Ill.
 Banner Horse Feed,
 Daisy Chick Feed,
 Daisy Chick Feed With Grit,
 Jewel Poultry Feed,
 Jewel Poultry Feed With Grit,
 Royal Meat Mash,
 Royal Pigeon Feed,
 Royal Pigeon Feed With Grit,
 Royal Poultry Feed,
 Royal Poultry Feed With Grit.

L. G. Campbell Mfg. Co., Owatonna, Minn.
 Choice Bran,
 Flour Middlings.

Canonsburg Milling Company, Canonsburg, Pa.
 Cotton Seed Meal,
 Linseed Oil Meal,
 Dried Beet Pulp,
 Pure Dustless Alfalfa Meal.

Canton Feed Milling Co., Canton, Ohio.
 Bako Horse and Mule Feed,
 No. 1 Bako C. & O. Feed,
 No. 2 Bako C. O. & B. Stock Feed,
 No. 1 Bako Scratching Grains,
 No. 2 Bako Scratching Grains.
 No. 1 Bako Stock Feed.

Canton Mercantile Co., Canton, Pa.
 Veribest Scratch Grains.

Cavalier Milling Co., Cavalier, N. D.
 Bran,
 Middlings,
 Mixed Feed.

Cereal Mills Co., Wausau, Wis.
 Corn and Oats Ground Feed,
 Hen Feed,
 Hominy Feed,
 Red Dog Flour,
 Wheat Bran with not Exceeding Mill Run Ground Screenings.
 Wheat and Rye Middlings with not Exceeding Mill Run Ground Screenings.

The Ceres Trading Co., Chicago, Ill.
 Ceres Brand Digester Tankage,
 Ceres Brand Meat Scrap.

Certified Farms Co., New York City.
 Certified Developing Scratch,
 Certified Evening Scratch,
 Certified Growing Mash,
 Certified Laying Mash,
 Certified Morning Scratch.

- F. B. Chamberlin Co., St. Louis, Mo.
Chamberlin's Perfect Chick Feed
- S. K. Chambers & Bro., Elkview, Pa.
June Pasture Dairy Feed.
- Champion Mfg. Company, Barto, Pa.
Chickseat Feed for Baby Chicks.
- Champion Roller Milling Co., Richmond, Indiana.
Wheat Bran,
Wheat Middlings or Shorts.
- Chapin Company, Hammond, Ind.
Centaur Stock Feed,
Green Diamond Brand Cottonseed Meal,
Green Diamond Hominy Meal,
Lactola Dairy Feed,
Marvel Malt Sprouts,
Pure Linseed Meal,
Unicorn Dairy Ration.
- Chase, Hibbard Mfg. Co., Elmira, N. Y.
Blue Ribbon Poultry Food.
- Chesbro Brothers, Attica, N. Y.
C. O. B. Feed,
Chesbro's Stock Feed,
Mascot Scratch Feed,
Peerless Dairy Feed,
Trojan Chick Feed,
Trojan Scratch Feed,
Wheelock's Horse Feed.
- Chippewa Feed & Grain Co., Inc., Buffalo, N. Y.
Chippewa Dairy Feed.
- C. S. Christensen Co., Madelia, Minnesota.
Wheat Bran,
Wheat Flour Middlings,
Wheat Middlings.
- Geo. C. Christian & Co., Minneapolis, Minn.
Berkshire Wheat Flour Middlings with Ground Screenings not Exceeding
Mill Run,
Jersey Wheat Bran with Ground Screenings not Exceeding Mill Run,
Poland Wheat Standard Middlings with Ground Screenings not Exceeding
Mill Run.
- L. C. Christian & Co., Minneapolis, Minn.
Bran,
Flour Midds,
Reddog Flour,
Standard Midds.
- City Roller Mills, New Castle, Pa.
Palm Oil Middlings.
- E. D. Clark, Altoona, Pa.
Superior Chick Food,
Superior Corn Feed Meal,
Superior Corn & Oats Chop,
Superior Hen Food,
Superior Horse Chop.
- Clarke Bros. & Company, Peoria, Ill.
Empire State Dairy Feed.
- Claro Milling Company, Waseca, Minn.
Claro Mixed Feed,
Claro Reddog Flour,
Claro Wheat Flour Middlings,
Claro Wheat Bran,
Claro Wheat Middlings,
Claro Standard Middlings.
- Cleveland Milling Co., Cleveland, Ohio.
Coarse Corn Meal,
Cracked Corn,
Hominy Feed,
No. 1 Chop,
Wheat Bran with Ground Screenings not Exceeding Mill Run.
Wheat Coarse Middlings with Grounds Screenings not Exceeding Mill Run.
Wheat Fine Middlings with Ground Screenings not Exceeding Mill Run.

- Clinton Sugar Refining Co., Clinton, Iowa.
 Clinton Corn Gluten Feed,
 Clinton Corn Germ Meal.
- Clover Leaf Milling Co., Buffalo, N. Y.
 Clover Leaf Calf Meal,
 Clover Leaf Dairy Feed,
 Clover Horse Feed,
 Peerless Horse Feed.
- H. C. Cole Mfg. Co., Chester, Ill.
 Wheat Bran,
 Wheat Middlings.
- Colonial Food Digester Co., Montrose, Pa.
 Colonial Food Digester,
 Colonial Poultry Regulator.
- The Colton Bros. Co., Bellefontaine, Ohio.
 Mixed Feed,
 Wheat Bran including Ground Screenings not Exceeding Mill Run,
 Wheat Middlings including Ground Screenings not Exceeding Mill Run.
- Columbia Milling Co., Columbia, Pa.
 Chick Feed,
 Hen Feed.
- Commander Mill Co., Minneapolis, Minn.
 Commander Bran with Ground Screenings not Exceeding Mill Run,
 Commander Flour Midds. with Ground Screenings not Exceeding Mill Run,
 Commander Low Grade Flour,
 Commander Mixed Feed with Ground Screenings not Exceeding Mill Run,
 Commander Std. Midds. with Ground Screenings not Exceeding Mill Run.
- Commercial Milling Co., Detroit, Mich.
 Cracked Corn,
 Fine Rye Middlings,
 Henkel's Chop Feed,
 Henkel's Coarse Feed Corn Meal,
 Henkel's Fine White Feed,
 Henkel's Poultry Feed,
 Mixed Feed with Ground Screenings not exceeding Mill Run,
 Standard Wheat Middlings with Ground Screenings,
 Wheat Bran,
 Wheat Fine Middlings with Ground Screenings.
- G. E. Conkey Company, Cleveland, Ohio.
 Conkey's Starting Food (For Chicks).
- E. W. Conklin & Son, Inc., Binghamton, N. Y.
 Arrow Chick Food,
 Arrow Egg Food,
 Atlas Scratch Grain.
- Consolidated Dressed Beef Co., Philadelphia, Pa.
 Consolidated Beef Scrap.
- Continental Cereal Co., Peoria, Ill.
 Continental Gluten Feed.
- W. A. Coombs Mfg. Co., Coldwater, Mich.
 Buckwheat Feed,
 Wheat Bran with Ground Screenings not Exceeding Mill Run,
 Wheat Mixed Feed with Ground Screenings not Exceeding Mill Run,
 Wheat Middlings with Ground Screenings not Exceeding Mill Run.
- Coppes Bros. & Zook, Napanee, Ind.
 Bran,
 Middlings,
 Reddog Flour.
- The Corby Co., Washington, D. C.
 Corby Dried Grains.
- Corn Products Refining Co., Buffalo, N. Y.
 Buffalo Corn Gluten Feed,
 Crescent Corn Gluten Feed,
 Diamond Corn Gluten Meal,
 Diamond Hog Meal,
 Globe Corn Gluten Feed,
 Queen Corn Gluten Feed

Cover Supply Co., Inc., Baltimore, Md.
C. S. C. Feed.

William G. Crocker, Minneapolis, Minn.

Red Dog Flour,
Wheat Bran with Ground Screenings not exceeding Mill Run,
Wheat Flour Middlings with Ground Screenings not exceeding Mill Run,
Wheat Mixed Feed with Ground Screenings not exceeding Mill Run,
Wheat Standard Middlings with Ground Screenings not exceeding Mill Run.

Crookston Milling Co., Crookston, Minn.

Coarse Bran,
Fine Middlings,
Flour Middlings.

Crouch Brothers Co., Erie, Pa.

Pure Corn & Oats Chop Feed,
Pure Corn Meal,
Pure Cracked Corn,
Wheat Bran,
Wheat Middlings.

Darling & Co., Chicago, Ill.

Darling's Blood Meal,
Darling's Granulated Bone,
Darling's Meat Crisps,
Darling's High Protein Meat Scraps,
Darling's Raw Bone Meal,
Darling's Standard Meat Scraps,
Darling's 40% Protein Digester Tankage,
Darling's 60% Protein Digester Tankage.

S. P. Davis, Little Rock, Ark.

Good Luck Cotton Seed Meal,
Standard Cold Pressed Cotton Seed Cake.

Dayton Milling Co., Towanda, Pa.

Dayton's Ideal Scratch Grains,
Dayton's Laying Mash,
Dayton's Prize Baby Chick.

Deerfield Milling Co., Knoxville, Pa.

Old Process Oil Meal,
Distillers Dried Grains from Rye,
Wheat Bran,
Wheat Middlings.

The Denver Alfalfa Milling & Products Co., Hartman, Colo.
Alfalfa Meal.

Deposit Milling Co., Deposit, N. Y.

Alfalfa Meal,
Corn Meal,
Cracked Corn,
Deposit White Mixed Feed,
Granulated Corn Meal,
Ground Corn, Oats & Rye,
Life Saver Feed,
Pure Corn & Oats Ground,
Pure Grain Mixed Hen Feed,
Wheat Bran,
Wheat Middlings,
Wheat Mixed Feed,
Scratch Grains.

Desoto Oil Co., Memphis, Tenn.
Desoto Cottonseed Meal.

Deutsch & Sickert Co., Milwaukee, Wis.

Barley Feed,
Bourbon Dist. Dried Grains,
Flour Middlings,
Hominy Feed,
Malt Sprouts,
Pure Dried Brewers Grains,
Reddog Flour,
Rye Middlings,
Spirits Dist. Dried Grains,
Wheat Bran,
Wheat Middlings.

The Dewey Bros. Co., Blanchester, Ohio.
 Corn Three D Grains,
 Bourbon Three D Grains.
 Dewey's Horse & Mule Feed,
 Dewey's Ready Ration,
 Dewey's Stock Feed,
 Eagle Three D Grains,
 Queen Cotton Seed Meal,
 Queen Three D Grains,
 Winter Wheat Bran,
 Winter Wheat Middlings.

The John Dewine Company, Yellow Springs, Ohio.
 Golden Chick Feed,
 Golden Chick Feed with Grit,
 Golden Hen Feed,
 Golden Hen Feed with Grit,
 Golden Mash Feed,
 Silver Chick Feed,
 Silver Hen Feed,
 Silver Hen Feed with Grit.

The Albert Dickinson Co., Chicago, Ill.
 Alfalfa Meal,
 Colonial Developing Feed No Grit,
 Colonial Developing Feed With Grit,
 Colonial Scratch Feed No Grit,
 Colonial Scratch Feed With Grit,
 Crescent Chick Feed No Grit,
 Crescent Chick Feed With Grit,
 Crescent Scratch Feed No Grit,
 Crescent Scratch Feed With Grit,
 Globe Chick Feed No Grit,
 Globe Chick Feed With Grit,
 Globe Developing Feed No Grit,
 Globe Developing Feed With Grit,
 Globe Egg Mash,
 Globe Scratch Feed No Grit,
 Globe Scratch Feed With Grit,
 King Pigeon Feed No Grit,
 King Pigeon Feed With Grit,
 Pine Tree Chick Feed No Grit,
 Pine Tree Chick Feed With Grit,
 Pine Tree Scratch Feed No Grit,
 Pine Tree Scratch Feed With Grit,
 Queen Poultry Mash,
 White Cross Chick Feed No Grit,
 White Cross Chick Feed With Grit,
 White Cross Horse Feed,
 White Cross Scratch Feed No Grit,
 White Cross Scratch Feed With Grit,
 White Cross Stock Feed.

Dixie Mills Co., E. St. Louis, Ill.
 Anchor Molasses Horse & Mule Feed,
 Dixie Dairy Feed,
 Dixie Horse and Mule Feed,
 Diamond Horse and Mule Feed.

Jacob Dold Pkg. Company, Buffalo, N. Y.
 Dold Quality Digester Tankage,
 Dold Quality Meat Meal,
 Dold Quality Meat Scrap,
 Dold Quality No. 2 Meat Scrap,
 Dold Quality Poultry Bone,
 Dold Quality Soluble Blood Flour.

Donahue Stratton Co., Milwaukee, Wis.
 Hiquality Malt Sprouts.

Dooley & Robinson, Delta, Pa.
 Bauernschmidt's Brewers' Dried Grains.

Douglas Company, Cedar Rapids, Iowa.
 Douglas Corn Gluten Feed.

The John P. Dousman Milling Co., De Pere, Wis.
 Bran.
 Middlings,
 Red Dog Flour.

- Du Bois Brewing Co., Du Bois, Pa.
Dried Brewers Grains.
- Duluth Superior Milling Co., Duluth, Minn.
Boston Mixed Feed,
Duluth Imperial Bran,
Flour Middlings,
Red Dog Flour,
S. Middlings.
- Duluth Universal Milling Co., Duluth, Minn.
Bran,
Middlings.
- The Dunlop Mills, Richmond, Va.
Dunlop Arrow Ship Stuff and Ground Recleaned Screenings not exceeding
Mill Run,
Dunlop Arrow Wheat Bran.
- Eagle Roller Mill Co., New Ulm, Minn.
Feed Corn Meal,
No. 2 Feed (Corn & Oats),
Hominy Feed,
Red Dog Superb Flour,
Rye Feed,
Rye Red Dog Flour,
Wheat Bran with Ground Screenings not Exceeding Mill Run,
Wheat Middlings with Ground Screenings not Exceeding Mill Run.
- The Early & Daniel Co., Cincinnati, Ohio.
Ce-re-a-lia Chick,
Ce-re-a-lia Egg Mash,
Ce-re-a-lia Rex Chop,
Ce-re-a-lia Scratch,
Ce-re-a-lia Sweets for Dairy.
Corn & Oats Chop,
Eaden Scratch No-Grit,
Tuxedo Chick,
Tuxedo Chop,
Tuxedo Scratch with Grit,
Tuxedo Scratch No Grit.
- R. D. Eaton Grain & Feed Co., Norwich, N. Y.
Eaton's Climax Grain Mixture for Laying Fowls,
Eaton's Growing Ration for Young Fowls,
Eaton's High Grade Pigeon Food,
Eaton's Life Saver Little Chick Food,
Eaton's Perfection Mash Mixture for Laying Fowls.
- Jonas F. Eby & Son, Lancaster, Pa.
Conestoga Gluten Feed,
Crystaloid Dairy Feed.
- B. A. Eckhart Milling Co., Chicago, Ill.
Bran with Ground Screenings not Exceeding Mill Run,
Middlings with Ground Screenings not Exceeding Mill Run,
Flour Middlings,
Mixed Feed, Bran & Middlings with Ground Screenings not Exceeding Mill
Run,
Rye Middlings.
- Edwards & Loomis Co., Chicago, Ill.
Cackle Fine Chick Feed No Grit,
Cackle Fine Chick Feed with Grit & Charcoal,
Cackle Poultry Feed No Grit,
Cackle Poultry Feed with Grit, Shell and Charcoal,
Excelsior Horse Feed,
Greeno Feed,
Harvest Horse Feed,
Pioneer Horse & Cattle Feed,
Pound Squab Pigeon Feed No Grit,
Pound Squab Pigeon Feed with Grit,
Red Comb Coarse Chick No Grit,
Red Comb Coarse Chick Feed With Grit & Charcoal,
Red Comb Fine Chick No Grit,
Red Comb Fine Chick Feed with Grit & Charcoal,
Red Comb Meat Mash with Shell and Charcoal,
Red Comb Poultry Feed No Grit,
Red Comb Poultry Feed with Grit, Shell & Charcoal,
Red Horn Calf Meal,
Red Horn Dairy Feed.

Elba Manufacturing Co., Maxton, N. C.
 Cotton Seed Meal,
 Elba Mixed Feed.

Eldred Mill Co., Jackson, Mich.
 Pure Bran,
 Pure Middlings,
 Pure Mill Feed.

Elevator Milling Co., Springfield, Ill.
 Hominy Feed.

Elkland Roller Mills, Elkland, Pa.
 Barlot Stock Feed,
 Cotton Seed Meal,
 Dried Brewers Grains,
 Gluten Feed,
 Hominy Feed,
 Old Process Oil Meal,
 Our Own Dairy Ration,
 Poultry Grains.

Empire Grain & Elevator Co., Binghamton, N. Y.
 Egee Dairy Feed,
 Egee Fancy Mixed Feed,
 Egee Horse Feed,
 Egee Stock Feed,
 Neverfall Dairy Feed,
 Pearl Hominy.

Empire Milling Co., Minneapolis, Minn.
 Empire Bran with Ground Screenings not Exceeding Mill Run,
 Empire Standard Middlings with Ground Screenings not Exceeding Mill Run,
 Empire Flour Middlings with Ground Screenings not Exceeding Mill Run,
 Empire Low Grade Flour,
 Empire Mixed Feed with Ground Screenings not Exceeding Mill Run,
 Pure Wheat Gray Shorts,
 Wheat Bran & Screenings,
 Wheat Mixed Feed & Screenings.

Empire Mills, Olean, N. Y.
 Brewers Dried Grains,
 Certified Mixed Feed,
 Cottonseed Meal,
 Dried Beet Pulp,
 Empire Feed,
 Mayflower Middlings,
 Wheat Bran.

Emporium Milling Co., Emporium, Pa.
 Emporium Feed,
 Felt's Poultry Mash.

Charles England & Co., Baltimore, Md.
 Distillers Dried Grains,
 Melvale Distilling Co. Dried Rye Grains,
 Stewart Distilling Co. Dried Rye Grains.

Equity Co-Operative Exchange, Wellsboro, Pa.
 Equity Horse Feed.

John W. Eshelman, Lancaster, Pa.
 J. W. E's Alfalfa Horse Feed,
 J. W. E's Alfalfa Molasses Horse Feed,
 J. W. E's Calf Meal,
 J. W. E's Chick Feed No Grit,
 J. W. E's Chick Feed 5% Grit,
 J. W. E's Developing Feed, No Grit,
 J. W. E's Hog Feed,
 J. W. E's Home-made Dairy Feed,
 J. W. E's Laying Mash,
 J. W. E's Pigeon Feed, No Grit,
 J. W. E's Scratch Feed, With Grit,
 J. W. E's Scratch Feed, No Grit,
 J. W. E's Stock Feed.

Evans Milling Co., Indianapolis, Ind.
 Evans Hominy Feed.

Everett, Aughenbaugh & Co., Waseca, Minn.

E-A Co. Wheat Bran,
E-A Co. Wheat Middlings,
E-A Co. Mixed Feed.

Excello Feed Milling Co., St. Joseph, Mo.

Excello Cattle Fattener,
Excello Chick Feed,
Excello Dairy Feed,
Excello Hen Feed,
Excello Horse Feed,
Excello Molasses Feed,
Reliable Hen Feed,
Reliable Horse & Mule Feed,
Reliable Molasses Feed,
Sho-Me Horse & Mule Feed.

Excelsior Mill Co., Yankton, S. D.

Wheat Bran,
Wheat Shorts.

Fairplay Feed Mills, Linton, Ind.

B. Mixed Dairy Feed,
Fairplay C. O. & B. Chop,
Fairplay Horse Feed,
Hominae,
Lay-Every-Day Scratch Feed,
Lay-Every-Day Scratch Feed, with Grit,
Success Chick Feed,
Success Scratch Feed,
Success Scratch Feed, with Grit & Oyster Shell,
Winner Chop,
Winter Wheat Bran with Ground Screenings not exceeding Mill Run,
Winter Wheat Middlings.

F. E. Farabaugh, Patton, Pa.

Dandy Dry Mash,
Mixed Hen Feed,

Faramel Manufacturing Co., Buffalo, N. Y.

Boggs Ceramel Horse Feed,
Faramel Dairy Feed,
Faramel Horse Feed.

Farmers Cotton Oil Co., Wilson, N. C.

Bull Dairy Feed,
Cotton Seed Meal.

Farmers Feed Co., New York, N. Y.

Bull Brand Dried Brewers Grains.

Federal Stock Food Co., Mifflinburg, Pa.

Federal Poultry Tonic,
Federal Stock Tonic.

Feeders Supply Co., Kansas City, Mo.

Equity Brand Cottonseed Meal and Cake,
Equity Brand Red Tag Cottonseed Meal.

Feed Products Milling Co., Chicago, Ill.

Eatall Chick Feed No Grit,
Eatall Horse Feed,
Eatall Meadow Feed,
Eatall Pigeon Feed with Grit,
Eatall Scratch Feed with Grit,
Eatall Scratch Feed no Grit.

Joseph Finch & Co., Pittsburgh, Pa.

Distillers Dried Grains.

George M. Finn, Syracuse, N. Y.

Chicken Feed prepared from Ground Meat & Bone Scrap.

The Fleischmann Company, New York, N. Y.

Fleischmann's Dried Grains.

The Flory Milling Co., Bangor, Pa.

Globe Cow Feed.

Fowler Commission Co., Kansas City, Mo.
 Alfalfa Meal
 Corn Chop,
 Wheat Bran,
 Wheat Middlings,
 Wheat Shorts.

The Franke Grain Co., Milwaukee, Wis.
 Rye Middlings,
 Wheat Bran,
 Wheat Middlings,
 Wheat Flour Middlings,
 Wheat Red Dog Flour.

The Franklin City Mills, Franklin, Pa.
 Franklin Horse Feed.

Franklin Milling Co., Swineford, Pa.
 Franklin Stock Feed,
 Franklin Stock Feed No. 2.

J. M. Frisch & Co., Baltimore, Md
 Alfalfa Meal
 Choice Cotton Seed Meal,
 Dried Brewers Grains,
 Dried Distillers Grains,
 Dried Malt Sprouts,
 Gluten Feed,
 Hominy Feed,
 Old Process Linseed Meal,
 Prime Cottonseed Meal.

The Fritz Company, Philadelphia, Pa.
 Ground Beef Scraps for Poultry.

Fuhrmann & Schmidt Brewing Co., Shamokin, Pa.
 Brewers Dried Grains.

John Fuoss, Bellwood, Pa.
 Corn,
 Corn and Oats.

Furst Brothers, Cedar Springs, Pa.
 Mixed Chop,
 Pure Wheat Bran,
 Barker's Horse, Cattle & Poultry Powder.

Gamble, Gheen & Co., Bellefonte, Pa.
 Excelsior Chick Food,
 Excelsior Hen Food,
 Mixed Chop,
 Pure Corn Chop,
 Pure Wheat Bran,
 Pure Wheat Middlings.

C. A. Gambrill Manufacturing Co., Baltimore, Md.
 Patapsco Bran,
 Patapsco Brown Middlings with Ground Screenings not exceeding Mill Run,
 Patapsco "G" Middlings,
 Patapsco Hog Feed,
 Patapsco Horse Feed,
 Patapsco Middlings with Ground Screenings not exceeding Mill Run,
 Patapsco Premier Middlings,
 Patapsco White Middlings.

Gambrill, Thomas Co., Frederick, Md.
 G. T. Corn & Oat Product Feed,
 G. T. Dairy Feed,
 G. T. Horse Feed.

O. Gandy & Co., South Whitley, Ind.
 Chop Feed,
 Gandy's Standard A Chick Feed,
 Gandy's Standard A Poultry Feed.

E. W. Garber, Mount Joy, Pa.
 Garber's Poultry Powder,
 Garber's Stock Food.

- Garland Milling Co., Greensburg, Ind.
Garland Mixed Feed.
- A. G. Gebhart & Co., Chicago, Ill.
Temptation Dairy Feed.
- Gibson Distilling Co., Gibsonton, Pa.
Distillers Dried Rye Grains.
- Globe Elevator Co., Buffalo, N. Y.
Anchor Brand Dairy Feed,
Anchor Horse Feed,
Blue Ribbon Developing Feed,
Blue Ribbon Growing Mash,
Blue Ribbon Horse Feed,
Blue Ribbon Laying Mash,
Blue Ribbon Little Chick Feed,
Blue Ribbon Pigeon Feed,
Blue Ribbon Scratch Feed,
Buffalo Dairy Mixed Feed,
Buffalo Stock Feed,
Corn Bran,
Globe Dairy Feed,
No. 1 Chop Feed.
- A. C. Godshall & Co., Inc., Lansdale, Pa.
Chick Feed,
Corn Meal,
Dry Mash,
Ground Ear Corn,
Mixed Chop,
Rye Middlings,
Scratch Feed,
Wheat Bran,
Wheat Middlings.
- Golden Grain Milling Co., E. St. Louis, Ill.
Acorn Horse & Mule Feed,
Cornette Horse & Mule Feed,
Golden Grain Alfalfa Meal,
Golden Grain Alfalfa Molasses Feed,
Golden Grain Dairy Feed,
Golden Grain Dry Horse & Mule Feed,
Golden Grain Horse & Mule Feed,
Mascot Horse & Mule Feed,
Percheron Horse & Mule Feed,
Puritan Horse & Mule Feed,
Southern Horse & Mule Feed.
- Goldsboro Pure Feed Co., Goldsboro, Pa.
Alfalfa Horse & Mule Feed,
Gold-O Dairy Feed,
Gold-O Dairy Feed No. 2,
Gold-O Horse Feed,
Gold-O Pure Cane Molasses Dairy Feed,
Gold-O Scratch Feed,
Gold-O Swine Feed,
June Bug Dairy Feed.
- The Gorgas-Pierie Manufacturing Co., Philadelphia, Pa.
Copra Cake Meal,
Flaxseed Cake Meal,
Hederich Oil Cake Meal,
Peanut Oil Cake Meal.
- James A. Goss & Bro., Maitland, Pa.
C. & O. Chop,
Wheat Bran,
Wheat Middlings.
- The Grafton Roller Mill Co., Grafton, N. Dak.
Bran,
Middlings,
Keystone Wheat Feed.
- Grain Products Sales Co., Buffalo, N. Y.
Columbia Corn Distillers Grains,
Rye Distillers Grains,
Yankee Distillers Grains.

O. H. Grandin Milling Co., Jamestown, N. Y.
Grandin's Stock Food.

John D. Graybill & Sons, Belleville, Pa.
Bran,
Middlings,
Pure Corn & Oats Chop.

Great Western Feed Co., St. Louis, Mo.
Alfalfa & Molasses Feed,
Merit Horse & Mule Feed,
Purity Dairy Feed,
Purity Hen Feed,
Purity Horse & Cattle Feed,
Purity Syrup Feed.

Greene Chick Feed Co., Marblehead, Mass.
Greene's Poultry Food.

The W. M. Griffin Co., Fort Wayne, Ind.
Poultry Compound,
Stock Mixture.

Gus Gronauer & Co., Memphis, Tenn.
Globe Brand Cottonseed Meal.

Th. Gwinn Milling Co., Columbus, Ohio.
Chick Feed,
Cracked Corn,
Dairy Feed with Screenings not exceeding Mill Run,
Horse & Mule Feed,
Mixed Feed with Screenings not exceeding Mill Run,
Red Dog Flour,
Wheat Bran,
Wheat Middlings with Screenings not exceeding Mill Run.

Jacob S. Haines, Allentown, Pa.
Mixed Chop,
Old Process Linseed Meal.

Dwight E. Hamlin, Pittsburgh, Pa.
H. & S. Alfalfa Feed,
H. & S. Alfalfa Feed (For Milch Cows),
H. & S. Alfalfa Feed with Oats,
H. & S. Horse, Mule & Dairy Feed,
H. & S. Landy Special Feed,
Hamlin's Purekane Molasses Feed,
Hamlin's Quality Feed,
William Special Feed.

Howard H. Hanks Co., Chicago, Ill.
Golden Egg Chick Feed, No Grit,
Golden Egg Pigeon Feed, with a Grit,
Golden Egg Scratch Feed, No Grit,
Golden Egg Scratch Feed, With Grit,
Hummer Horse Feed,
Kingfalfa Horse Feed,
Kingfalfa Meadow Feed.

The Hardesty Milling Co., Canal Dover, Ohio.
Bran,
Middlings.

George L. Harding, Binghamton, N. Y.
Harding's Baby Chick Food,
Harding's Granulated Milk Albumen,
Harding's Meat Scraps,
Harding's Milk Protein Mash,
Harding's U. S. Egg Builder.

Harrington Mills, Montrose, Pa.
Standard Middlings,
Flour Middlings,
Harrington's Egg Producer,
Old Process Oil Meal,
Red Dog Middlings.

- The Harter Milling Co., Toledo, Ohio.
 Bran,
 Corn & Oats Chop,
 Cracked Corn,
 Unbolted Meal-Feed Meal,
 Winter-Middlings,
 Winter Mixed Feed.
- W. H. Haskell & Co., Toledo, Ohio.
 Haskell's Stock Feed,
 Pure Hominy Meal.
- Joseph H. Hawks, Allentown, Pa.
 Mixed Chop,
 Pure Wheat Bran,
 Pure Wheat Middlings,
 Pure Rye Middlings.
- G. A. Hax & Co., Baltimore, Md.
 Dried Rye Distillers Grains.
- A. Hayden, Elizabeth, Pa.
 Bran,
 Middlings,
 Pure Corn and Oats Chop.
- The Haywood Alfalfa Warehouse Co., Kansas City, Mo.
 Algreen Alfalfa Meal.
- Hazleton Mercantile Co., Hazleton, Pa.
 Corn Chop,
 Mixed Chop,
 Power City Hen Food,
 Rye Mixed Chop,
 Star Mixed Feed.
- Harry G. Heacock, Orangeville, Pa.
 Mixed Chop,
 Pure Wheat Bran,
 Pure Wheat Middlings.
- Hecker-Jones-Jewell Milling Co., Buffalo, N. Y.
 Choice Wheat Bran with Trace of Screenings,
 Fancy White Middlings,
 Flour Middlings with Mill Run Screenings,
 Mixed Feed with Mill Run Screenings,
 Red Dog Flour,
 Standard Middlings with Mill Run Screenings.
- The Heffner Milling Co., Circleville, O.
 Corn Bran,
 Dixie Hen Scratch Grains with Grit,
 Dixie Hen Scratch Grains without Grit,
 Heffner's Stock Food.
- J. W. Hemmerly, Hazleton, Pa.
 Hemmerly's Condition Powder.
- The Hen-E-Ta Bone Co., Newark, N. J.
 Hen-O-La Dry Mash.
- Hirst & Begley Linseed Co., Chicago, Ill.
 Hirst & Begley's Linseed Co.'s Flaxseed Product.
- The H-O Company, Buffalo, N. Y.
 The H-O Company's Algrane Horse Feed,
 The H-O Company's Algrane Milk Feed,
 The H-O Company's Algrane Scratching Feed,
 The H-O Company's Chick Feed,
 The H-O Company's Horse Feed with Molasses,
 The H-O Milk Feed with Molasses,
 The H-O Company's New England Stock Feed,
 The H-O Company's Poultry Feed,
 The H-O Company's Steam Cooked Chick Feed.
- John Hoffer Flouring Mill Co., Steelton, Pa.
 Wheat Bran,
 Wheat Middlings,
 Wheat Shorts.

- J. F. Hogsett & Son, Uniontown, Pa.
C. Chop.
- J. H. Hornby & Sons, New Brighton, Pa.
Hornby's C. O. & B. Chop Feed.
- The Hottelet Co., Milwaukee, Wis.
Dried Beet Pulp,
Hector Distillers Dried Grains,
Holstein Brewers Dried Grains,
XX Distillers Dried Grains.
- J. & C. Howard, Everett, Pa.
Special Middlings,
Wheat Bran.
- Hubbard Milling Co., Mankato, Minn.
Buckeye Reddog Flour,
Flaky Bran,
Flour Middlings,
Standard Middlings,
Sterling Reddog Flour.
- J. C. Hubinger Brothers Co., Keokuk, Iowa.
KKK Corn Gluten Feed.
- George Hull & Sons, Hanover, Pa.
Scratch Feed, No Grit or Shell.
- Humphreys-Godwin & Co., Memphis, Tenn.
Dixie Brand Cottonseed Meal,
Forfat Brand Cottonseed Meal,
77 Cottonseed Feed.
- James L. Hunter & Co., Atlanta, Ga.
Choice Cottonseed Meal,
Standard Cottonseed Meal.
- The Huron Milling Co., Harbor Beach, Mich.
Jenk's Gluten Feed.
- R. R. Ikeler, Bloomsburg, Pa.
Mixed Chop.
- The Illinois Vinegar Manufacturing Co., Chicago, Ill.
Ivy Grains.
- The Imperial Grain & Milling Co., Toledo, Ohio.
C. O. & B. Feed,
Imperial Feed Meal,
No. 1 Chop,
Premium Chop,
Steam Cooked Feed.
- Independent Brewing Co., Pittsburgh, Pa.
Dried Brewers Grains, Duquesne Brewery Branch,
Dried Brewers Grains, Chartiers Valley Brewery Branch,
Dried Brewers Grains, Homestead Brewery Branch,
Dried Brewers Grains, First National Brewery Branch,
Dried Brewers Grains, Loyalhanna Brewery Branch,
Dried Brewers Grains, New Kensington Brewery Branch.
- Industrial Distilling Co., Waterloo, N. Y.
Columbia Corn Distillers Grains.
- International Glue Co., Boston, Mass.
Red Star Brand Fish Scrap.
- International Stock Food Co., Minneapolis, Minn.
International Grofast Calf Meal,
International Medicinal Stock Food Tonic,
International Poultry Food Tonic.
- International Sugar Feed Co., Minneapolis, Minn.
International Alfalfa Meal & Molasses,
International Cattle Feed,
International Climax Dairy Feed,
International Dairy Feed,
International Dan Patch Special Horse Feed,
International Hog Feed and Charcoal,
International Poultry Feed (Chick),
International Poultry Feed (Scratch),
International Special Dairy Feed.

- Iron City Brewery, Pittsburgh, Pa.
Dried Brewers Grains.
- Jamestown Electric Mills, Jamestown, N. Y.
Electric Chick Feed,
Electric Hen Feed,
Jem Stock Feed,
Purity Milk Maker,
Purity Poultry Mash.
- Jennison Brothers, Janesville, Minn.
Bran,
Hard-to-beat Middlings,
Ivanhoe Middlings,
Standard Middlings.
- W. J. Jennison Co., Minneapolis, Minn.
Wheat Bran with Ground Screenings not exceeding Mill Run,
Wheat Flour Middlings with Ground Screenings not exceeding Mill Run.
- H. M. Johnson, Athens Ga.
Prime Cottonseed Meal.
- Johnstown Dry Grains Co., Johnstown, Pa.
Dried Brewers Grains.
- M. A. Joshel, Geneva, Ill.
Peerless Dried Brewers Grains.
- The Joslin-Schmidt Co., Cincinnati, Ohio.
Abattoir Brand, Complete Poultry Food,
Abattoir Brand, Digester Tankage,
Abattoir Brand, Meat Meal,
Abattoir Brand, Meat Scraps,
Abattoir Brand, Poultry Bone.
- John Kam Malting Co., Buffalo, N. Y.
Malt Sprouts.
- Kansas Alfalfa Products Co., Newton, Kans.
Alfalfa Meal.
- The Kansas Flour Mills Co., Kansas City, Mo.
Mill Run Bran & Screenings,
Standard Shorts & Wheat Screenings,
Wheat Bran & Screenings,
White Middlings & Wheat Screenings,
White Shorts and Wheat Screenings.
- The Kansas Milling Co., Wichita Kans.
Climax Wheat Brown Shorts,
Climax Wheat White Shorts,
Wheat Bran with Mill Run Screenings,
Wheat Mixed Feed with Mill Run Screenings.
- Kauffman-Schaeffer Co., Fleetwood, Pa.
Gluten Feed.
- The Kaw Milling Co., Topeka, Kans.
Wheat Bran,
White Wheat Middlings.
- K. B. R. Milling Co., Marquette, Kans.
Pure Wheat Shorts,
Wheat Bran & Wheat Screenings.
- George A. Keck, Allentown, Pa.
Cob Chop,
Corn Chop,
Cracked Corn,
Mixed Chop,
Oats Chop,
Rye Chop.
- The Keever Starch Co., Columbus, Ohio.
Keever Gluten Feed.
- Kelloggs & Miller, Amsterdam, N. Y.
Pure Old Process Oil Meal.

Spencer Kellogg & Sons, Inc., Buffalo, N. Y.
Pure Old Process Oil Meal.

The William Kelly Milling Co., Hutchison, Kansas.
Standard Wheat Shorts,
Wheat Bran & Screenings,
Wheat Mixed Feed & Screenings.

Kemper Mill & Elevator Co., Kansas City, Mo.
Anchor Brand Cottonseed Meal,
Anchor Bran with Ground Screenings not exceeding Mill Run,
Carnation Middlings with Ground Screenings not exceeding Mill Run,
Crescent Middlings with Ground Screenings not exceeding Mill Run,
Crown Middlings with Ground Screenings not exceeding Mill Run,
Diamond K Bran with Ground Screenings not exceeding Mill Run,
Rainbow Mixed Feed with Ground Screenings not exceeding Mill Run.

John B. A. Kern & Sons, Milwaukee, Wis.
Eagle Barley Feed,
Eagle Hominy Feed,
Eagle Rye Middlings with Ground Screenings not exceeding Mill Run,
Eagle Wheat Bran with Ground Screenings not exceeding Mill Run,
Eagle Wheat Flour Middlings with Ground Screenings not exceeding Mill Run,
Eagle Red Dog Flour,
Eagle Wheat Standard Middlings with Ground Screenings not exceeding Mill Run.

Kershaw Oil Mill, Kershaw, S. C.
Ker-Mill Dairy Feed,
Palmetto Brand Cottonseed Meal,
Perfection Brand Cottonseed Meal.

Keystone Commercial Co., McKeesport, Pa.
John-Hen Little Chick Feed,
John-Hen Meat Hash,
John-Hen Poultry Feed.

Keystone Mills, Macungie, Pa.
Corn Cob Meal,
Keystone Germ Feed,
Rye Midds.,
Wheat Bran,
Wheat & Rye Middlings.

The Kimball Milling Co., Kansas City, Mo.
Corn Bran.

J. C. Klander, Est., Philadelphia, Pa.
Dried Brewers Grains.

Klepser Brothers, Altoona, Pa.
Corn Chop,
Cow Chop,
Hen Feed,
Horse Chop.

H. W. Koch & Co., Phila., Pa.
Golden Grain Dairy Feed,
Oatfalfa Feed,
Puritan Feed.

Kornfalfa Feed Mfg. Co., Kansas City, Mo.
Kawmo Horse & Mule Feed,
Kay Horse & Mule Feed,
K. C. Straight Alfalfa Molasses Feed,
Kens Horse & Mule Feed,
Klimax Horse & Mule Feed,
Kluk Poultry Feed (Chick-Scratch),
Kornfalfa Feed,
Kornfalfa Kandy Feed,
Krow Poultry Feeds (Chick-Scratch),
Pioneer Alfalfa Meal.

H. B. Kratz & Co., Schwenksville, Pa.
Ideal Chick Feed,
Ideal Hen Feed,
Ideal Mash Feed,
Ideal Pigeon Feed.

- Chas. A. Krause Milling Co., Milwaukee, Wis.
 Alfalfa Meal.
 Badger Cream Flakes.
 Badger C. & O. Feed,
 Badger Dairy Feed,
 Badger Evergreen Feed,
 Badger Fancy Mixed Feed,
 Badger Fancy Middlings,
 Badger Hominy Feed,
 Badger Horse Feed,
 Badger Stock Feed,
 Blue Top Fine Chick Feed,
 Blue Top Scratch Feed,
 C. O. & B. Feed,
 Derby Horse Feed,
 Maize Reddog Flour.
- The Kuenzel Mills Co., New Bremen, Ohio
 Pure Winter Wheat Bran.
 Pure Winter Wheat Middlings,
- Kunkle Flouring Mills, Rossville, Pa.
 Pure Mixed Chop No. 3,
 Pure Mixed Chop No. 4,
 Pure Wheat Bran No. 1.
 Pure Wheat Midds. No. 2.
- The La Grange Mills, Red Wing, Minn.
 Wheat Bran,
 Wheat Middlings,
 Wheat Red Dog Extra Flour.
- The Lake Erie Milling Co., Toledo, Ohio.
 C. O. & B. Chop,
 Flaked Oats & Corn Chop,
 K. C. Chop,
 Mollett Scratch Feed,
 Park City Stock Feed,
 Pure Corn & Oats Chop.
- Lake of the Woods Milling Co., Ltd., Montreal, Canada,
 Wheat Bran.
- The Lake Shore Elevator Co., Cleveland, Ohio.
 Big-Squab Pigeon Food,
 Equality Scratch Food, No Grit,
 Golden Chick Food,
 Golden Growing Food,
 Gro-Chic Developing Food,
 Hart's Competition Horse Food,
 Hart's Special Dairy Food,
 Harteno Horse Food,
 La-Egg Scratch Food, No Grit,
 Lake Shore Dairy Food,
 Peerless No. 1 Chop Feed,
 Puritan No. 2 Chop Feed,
 Quality Dry Laying Mash,
 Special Scratch Food, No Grit,
 Start-Rite Chick Food.
- J. C. Landes, Collegeville, Pa.
 Corn Bran,
 Corn Gluten Feed,
 Pure Wheat Bran,
 Pure Wheat Middlings,
 Wheat Bran with Mill Run of Screenings.
- Lanier Bros., Nashville, Tenn.
 Canary Brand Cottonseed Meal,
 Jersey Brand Cottonseed Meal.
- The Larabee Flour Mills Co., Hutchison, Kans.
 Wheat Bran with Mill Run Screenings not to exceed 8%.
 Wheat Shorts with Mill Run Screenings not to Exceed 8%.
- The Large Distilling Co., Pittsburgh, Pa.
 Distillers Rye Grains,

- The Larrowe Milling Co., Detroit, Mich.**
 Brownie Grains,
 Dried Beet Pulp,
 Dried Beet Pulp & Molasses,
 Larro-Feed,
 Larro-Mash,
 Log Cabin Horse Feed,
 Log Cabin Poultry Scratch Feed,
 Mingo Mixed Feed,
 Staff Brand Cottonseed Meal,
 Wheat Bran and Wheat Middlings may contain Ground Screenings not
 exceeding Mill Run.
- Lawrenceburg Roller Mills Co., Lawrenceburg, Ind.**
 Golden Bull Brand,
 Golden Bull Middlings,
 Golden Bull Mixed Feed,
 Snowflake Bran,
 Snowflake Middlings,
 Snowflake Mixed Feed,
- Laxo Cake Meal Co., Chicago, Ill.**
 Old Process Laxo Cake Meal..
- The Lea Milling Co., Wilmington, Del.**
 Chick Feed,
 Corn and Oats Chop,
 Blue Hen Chicken Scratch Feed,
 Horse Feed,
 Mash,
 Mixed Feed,
 Wheat Middlings with Screenings.
- LeBar, Frank, Stroudsburg, Pa.**
 Mixed Feed.
 Scratch Grains.
- Go. H. Lee Co., Omaha, Neb.**
 Lee's Egg Maker.
- The Lee-Warren Mlg. Co., Salina, Kans.**
 Fancy White Wheat Middlings,
 Wheat Bran and Screenings,
 Wheat Shorts.
- Levan & Sons, Columbia, Pa.**
 L. & S. Chick Feed,
 L. & S. Hen Feed,
 L. & S. Poultry Mash.
- Lidgerwood Mill Co., Lidgerwood, N. D.**
 Bran,
 Middlings.
- Listman Mill Co., LaCrosse, Wis.**
 Elmco Bran,
 Elmco Mixed Feed,
 Elmco Red Dog Flour,
 Elmco Std. Midds.,
 Elmco White Midds.
- Little Giant Food Co., Newark, N. J.**
 Little Giant Stock Food Tonic.
- The Loudonville Mill & Grain Co., Loudonville, Ohio.**
 Loudonville Bran,
 Loudonville Middlings,
 Loudonville Mixed Feed.
- Loughry Bros. Milling & Grain Co., Monticello, Ind.**
 Loughry's Buckwheat Mixed Feed,
 Loughry's Corn & Oats Chop,
 Loughry's Mixed Feed,
 Loughry's Wheat Middlings & Screenings,
- Louisiana State Rice Milling Co., New Orleans, La.**
 Rice Polish.
- L. B. Lovitt & Co., Memphis, Tenn.**
 Lovitt Brand Cotton Seed Meal.

- D. & A. Lukenbach, Bethlehem, Pa.
Horse Chop,
Mixed Chop.
- Luxemburg Milling Co., Luxemburg, Wis.
Rye Mixed Feed.
- R. S. McCague, Pittsburgh, Pa.
Diamond Scratch Feed, No Grit,
Diamond Scratch Feed, With Grit.
- Frank McCall's Sons, Chester, Pa.
McCall's Special Horse Feed.
- M. M. McInnis, Meridan, Miss.
Golden Rod Brand Cotton Seed Meal.
Yellow Jessamine Brand Cottonseed Meal,
- McMurtrie Milling Co., Belvidere, N. J.
Corn Ear Meal,
Horse Feed,
Mixed Grains,
Rye Middlings,
Wheat Bran,
Wheat Middlings.
- J. M. McDonald, Cincinnati, Ohio.
Kineda Prime Cottonseed Meal,
Macado Cottonseed Meal,
Kineda Gluten Feed.
- Maney Milling Co., Omaha, Neb.
Pure Wheat Shorts,
Wheat Bran with Ground Screenings not exceeding Mill Run
- Mann & Allshouse, Easton, Pa.
Chick Food,
Ground Mixed Food,
Mixed Grains,
Poultry Mash,
Rye Middlings,
Wheat Bran,
Wheat Middlings.
- The Mann Brothers Co., Buffalo, N. Y.
Old Process Linseed Oil Meal.
- Marshall Milling Co., Marshall, Minn.
Bran,
Red Dog Flour,
Wheat Shorts,
White Middlings.
- Martin & Company, Altoona, Pa.
Corn Chop,
Corn and Oat Chop,
Horse Chop,
Martin's Chicken Feed,
Martin's Poultry Mash,
Rye and Oats.
- Masontown Brewing Co., Masontown, Pa.
Brewers Dried Grains.
- C. P. Matthews & Sons, Inc., Scranton, Pa.
Best Mixed Feed for Chickens,
Best Mixed Feed for Cows,
Best Mixed Feed for Horses,
Mixed Feed,
Mixed Grain for Chickens,
Poultry Mash.
- Mathers Bros., Greenville, Pa.
Bran,
Corn and Oats Chop.
- Mauser & Cressman, Catasauqua, Pa.
Mixed Chop,
Poultry Mash,
Rye Bran and Middlings,
Scratch Feed,
Wheat Bran,
Wheat Midds.

- Mauser Mill Co., Treichlers, Pa.**
 Chick Feed,
 Corn & Oats Chop,
 Dairy Feed,
 Dry Mash,
 Hen Feed,
 Horse Feed,
 Mix Chop,
 Wheat and Rye Red Middlings,
 Wheat and Rye White Middlings.
- Memphis Cotton Hull & Fibre Co., Ltd., Memphis, Tenn.**
 Cyclone Cotton Seed Feed.
- Memphis Cottonseed Products Co., Memphis, Tenn.**
 Selden Cotton Seed Meal.
- Meridian Grain & Elevator Co., Meridan, Miss.**
 Tip Top Choice Cotton Seed Meal,
 Tip Top Prime Cotton Seed Meal.
- The Metzger Seed & Oil Co., Toledo, Ohio.**
 Old Process Oil Meal.
- Geo. J. Meyer Malting Co., Buffalo, N. Y.**
 Malt Sprouts.
- Midland Linseed Products Co., Minneapolis, Minn.**
 Midland Brand Pure Old Process Ground Linseed Cake
- J. B. Miller & Son, New Danville, Pa.**
 Miller's Poultry Mash.
- Z. Miller, Enola, Pa.**
 Miller's Stock Food.
- Milwaukee Grains & Feed Co., Milwaukee, Wis.**
 Crown Dried Brewers Grains,
 Malt Sprouts.
- Miner Hilliard Milling Co., Wilkes-Barre, Pa.**
 Colonial Middlings,
 F. O. Horse Feed,
 Little Chick Feed,
 Corn Meal,
 Mihimico Dairy Feed,
 Mihimico Stock Feed,
 Mixed Chicken Feed,
 No. 1 Chop,
 No. 1 Scratch Feed,
 Poultry Mash,
 Special Scratch Feed,
 Steam Cooked Flakeline,
 Steam Cooked Hominy Feed,
 Mixed Chop.
- Minnesota Linseed Oil Co., Minneapolis, Minn.**
 Ground Linseed Cake, Old Process.
- Henry C. Moffat, Buffalo, N. Y.**
 Malt Sprouts.
- The Mollett Grain & Milling Co., Toledo, Ohio.**
 C. O. B. Chop,
 Corn & Oats Chop,
 Flaked Oats & Corn Chop,
 K. C. Chop,
 Mollett Scratch Feed,
 Park City Stock Feed.
- C. L. Montgomery & Co., Memphis, Tenn.**
 Canary Brand Cottonseed Meal,
 Canary Extra Brand Cottonseed Meal.
- Morris & Company, Chicago, Ill.**
 Big Brand Meat Meal,
 Big Brand Meat Scraps,
 Big Forty Digester Tankage,
 Big Sixty Digester Tankage.
- Moseley & Motely Milling Co., Rochester, N. Y.**
 Big B Choice Wheat Bran,
 Wheat Middlings with Ground Screenings not Exceeding Mill Run

Motts & Company, Cleveland, Ohio,
Cleveland Linseed Oil Meal,
Motts Hog Meal,

F. T. Maynard Roller Mills, New Albany, Pa.
Keystone Scratch Feed.

Mystic Milling Co., Sioux City, Iowa.
Flour Middlings,
Hominy Feed,
Mixed Feed,
Wheat Bran,
Mystic Growing Mash,
Mystic Laying Mash.

National Feed Co., St. Louis, Mo.
Corn Bran,
Old Process Linseed Meal,
Prime Cotton Seed Meal,
Pure Alfalfa Meal,
Pure Hominy Feed,
Reground Oat Hulls,
Wheat Bran with Screenings not exceeding Mill Run,
Wheat Middling with Screenings, not exceeding Mill Run,
Wheat Mixed Feed with Screenings not exceeding Mill Run.

National Oats Co., St. Louis, Mo.
Alasco Sweet Meal,
Corno Dairy Feed,
Corno Horse & Mule Feed,
Corno Sweet Feed,
Molasco (The Feed that's Sweet),
Nutro Feed,
Pawnee Cow Feed,
Pawnee Feed,
Pawnee Molasses Feed.

Nebraska Alfalfa Mill Co., Lexington, Neb.
Brown Alfalfa Meal,
Green Alfalfa Meal.

Henry Neff, Salamanca, N. Y.
Corn Meal,
Cracked Corn,
Mixed Poultry Grain (Free from Shell or Grit),
Pure Corn and Oats Feed.

K. & E. Neumond, St. Louis, Mo.
Goldness Kalb Brewers Dried Grains.

The New Oxford Pure Feed Co., New Oxford, Pa.
Pure Calf Meal,
Pure Cane Molasses Dairy Feed No. 1,
Pure Cane Molasses Dairy Feed No. 2,
Pure Cane Molasses Concentrated Dairy Feed,
Pure Cane Molasses Horse & Mule Feed,
Pure Cane Molasses Swine Feed,
Pure Dry Mash Poultry Feed.

New Prague Flouring Mill Co., New Prague, Minn.
Seal of Minnesota Bran,
Seal of Minnesota Flour Midds.,
Seal of Minnesota Germ Midds.,
Seal of Minnesota Low Grade Flour,
Seal of Minnesota Special Midds.,
Seal of Minnesota Standard Midds.

The Newsome Feed & Grain Co., Pittsburgh, Pa.
Newfield Cream Flakes,
Newfield Dairy Feed,
Newfield Evergreen Feed,
Newfield Fancy Middlings,
Newfield Fancy Mixed Feed,
Newfield Hominy Feed,
Newfield Horse Feed,
Newfield Stock Feed,
Palmo Midds.

New Ulm Roller Mill Co., New Ulm, Minn.
 Coarse Bran,
 Ground Corn and Oats,
 Hominy Feed,
 Rye Feed,
 Wheat Middlings.

Nickel Plate Elevator Co., Cleveland, Ohio.
 Alfalfa Molasses Horse Feed,
 Economy Chick,
 Economy Chick with Grit,
 Economy Chop Feed,
 Economy Digester Tankage,
 Economy Dry Horse Feed,
 Economy Mash Feed,
 Economy Molasses Horse Feed,
 Economy Meat Scraps,
 Economy Pigeon Feed,
 Economy Scratch,
 Economy Scratch with Grit,
 Imperial Chick Feed,
 Imperial Growing Feed,
 Imperial Molasses Horse Feed,
 Imperial Pigeon Feed,
 Imperial Scratch Feed,
 Special Imperial Scratch,
 Yellow Corn Siftings.

Noblesville Milling Co., Noblesville, Ind.
 N. M. Co.'s Mixed Feed.

Willis Norton & Co., Topeka, Kans.
 Bran & Screenings.
 Shorts & Screenings.

W. C. Nothorn, Little Rock, Ark.
 Bee Brand Cottonseed Meal.

Nowak Milling Corporation, Buffalo N. Y.
 Alfal-Mo-Lene Horse Feed,
 Butterine Dairy Feed,
 Cream-O-Lene Dairy Ration,
 Justice Brand Hominy,
 Justice Creamery Feed,
 Justice Growing Mash,
 Justice Laying Mash,
 Lay-Egg-O Dry Mash,
 Pure-Mo-Lene Horse Feed,
 Union Dairy Feed,
 Vim-O-Lene Dairy Ration,
 Marathon Scratch Feed.

The Northwestern Consolidated Milling Co., Minneapolis, Minn.
 Planet Feed,
 Pure Wheat Bran,
 Wheat Flour Middlings with Ground Screenings not exceeding Mill Run,
 Wheat Standard Middlings with Ground Screenings not exceeding Mill Run,
 Wheat Mixed Feed composed of Wheat Bran, Flour Middlings and Ground
 Screenings not exceeding Mill Run.
 XXX Comet Red Dog Flour.

The Northwestern Elevator & Mill Co., Toledo, Ohio.
 Wheat Bran,
 Wheat Middlings.

Northwestern Milling Co., Little Falls, Minn.
 Bran,
 Fancy Country Midds.,
 Low Grade Flour,
 Mixed Feed,
 White Flour Midds.

The North Star Feed & Cereal Co., Minneapolis, Minn.
 No. 1 Corn & Oats Feed,
 No. 2 Corn & Oats Feed,
 No. 3 Corn & Oats Feed,
 Rye Middlings.

- Northwestern Yeast Co., Chicago, Ill.
 Corn Bran,
 Rye Feed.
- G. Ober & Sons Co., Baltimore, Md.
 Ober' Royal Crown Beef Meat for Poultry.
- Oil Seeds Co., New York, N. Y.
 Alpha Brand Peanut Oil Meal,
 Beta Brand Peanut Oil Meal,
 Coco Brand Cocoanut Oil Meal,
 Rape Seed Oil Meal.
- The O. K. Company, New York, N. Y.
 Puritan Chick Food.
- Omaha Alfalfa Milling Co., Omaha, Neb.
 Evergreen Horse Feed.
 Al-Corn-O Horse Feed,
 Alfalfa Meal.
 Alfalfa Svr. Feed,
 Alfalmo Feed,
 Cream Alfalfa Dairy Feed,
 Greenalfalfa Horse Feed,
 Green Meadow Dairy Feed,
 Peerless Alfalmo Horse Feed,
 Perfection Horse Feed.
- Osakis Milling Co., Osakis, Minn.
 Fancy Bran,
 Fancy White Middlings,
 Middlings.
- Osceola Mill & Elevator Co., Osceola Wis.
 Rye Middlings.
- The D. H. Owen Co., Youngstown, Ohio.
 Challenge Dairy Feed,
 Challenge Fancy Middlings,
 Challenge Horse Feed.
 Challenge Scratch Feed without Grit,
 Challenge Stock Feed.
- The Park & Pollard Co., Boston, Mass.
 Alfalfa.
 Fattening Feed,
 Blue Ribbon Meat Scraps,
 Gritless Chick Feed,
 Growing Feed.
 Intermediate Chick Feed,
 Lay or Bust Dry Mash,
 Margaret Mahaney's Turkey Feed,
 Oswego Mash.
 Oswego Meal.
 Red Ribbon Chick Feed,
 Red Ribbon Scratch Feed,
 Screened Scratch Feed,
 Stock Feed.
- F. T. Parker Co., Philadelphia, Pa.
 American Red Tag Cottonseed Meal,
 Cyclone Brand Cottonseed Feed.
- The Patent Cereal Co., Geneva, N. Y.
 Hominy Feed.
- G. E. Patterson & Co., Memphis, Tenn.
 Alfa-Cane Stock Feed,
 Alfamation Horse Feed,
 Apex Stock,
 Crown Horse Feed,
 Katleat Dairy Food,
 Novo Dairy Feed,
 Rex Horse Feed,
 Sugaration Stock Feed.
- Penn Grains & Feed Co., Philadelphia, Pa.
 Brewers Dried Grains,
 Malt Sprouts.

The Penwick Distillery, Cheswick, Pa.
Distillers Dried Grains.

The Francis Perot's Sons Malting Co., Philadelphia, Pa.
Malt Sprouts.

M. C. Peters Mill Co., Omaha, Neb.
Alfalfa Queen Mills Balanced Dairy Feed,
Corn Feed Meal,
June Pasture,
Peters Alfalfa Molasses Feed,
Peters Arab Horse Feed,

Peters High Score Alfalfa Molasses Feed.
Peters King Corn,
Peters Lucern Alfalfa Meal,
Peters Rabbit Mule Feed,
Peters Re-Peter Horse Feed.

Pfeffer Milling Co., Lebanon, Ill.
Corn Bran,
Hominy Feed,
Wheat Bran,
Wheat Middlings with Ground Screenings not exceeding Mill Run.

Phelps & Sibley Co., Cuba, N. Y.
Fancy Wheat Bran,
Fancy Wheat Middlings,
Favorite Mixed Grains,
Favorite Poultry Mash,
P. & S. White Feed,
P. & S. Yellow Feed,
Scratch Grains.

Philadelphia Seed Co., Inc., Philadelphia, Pa.
N. A. Competition Fish Mash Feed,
N. A. Competition Scratch Feed,
Purgrain Chick Developing Mash,
Purgrain Laying Mash Feed,
Purgrain Pigeon Feed,
Purgrain Scratch Chick Developer,
Purgrain Scratch Chick Developer No. 2,
Purgrain Scratch Poultry Feed,
Purgrain Scratch Poultry Feed No. 2,
Purgrain Scratch Chick Starter,
Purgrain Scratch Chick Starter No. 2,
Special Fanciers Pigeon Feed No. 1,
Special Fanciers Pigeon Feed No. 2,
Special Fanciers Pigeon Feed No. 3,
Special Fanciers Pigeon Feed No. 4.

Phillipsburg Milling, Lighting & Heating Co., Phillipsburg, Pa.
Corn Chop,
Mixed Chop,
Oats & Rye Chop,
Wheat Bran,
Wheat Middlings.

Phoenix Mill Co., Minneapolis, Minn.
Red Dog Flour,
Wheat Bran with Ground Screenings not to exceed Mill Run.
Wheat Flour Middlings with Ground Screenings not to exceed Mill Run.
Wheat Standard Middlings with Ground Screenings not to exceed Mill Run

Piel Brothers Starch Co., Indianapolis, Ind.
P. Bro. Corn Gluten Feed.

Pierce Milling Co., Pierce, Neb.
Pure Wheat Bran,
Pure Wheat Shorts.

Pillsbury Flour Mills Co., Minneapolis, Minn.
Durum Wheat Bran with Ground Screenings not exceeding Mill Run,
Durum Wheat "B" Middlings with Ground Screenings not exceeding Mill Run,
Pillsbury's Fancy Wheat Mixed Feed with Ground Screenings not exceeding
Mill Run,
Pillsbury's Wheat "A" Middlings with Ground Screenings not exceeding
Mill Run,

Pillsbury Flour Mills Co.—Continued.

Pillsbury's Wheat with Ground Screenings not exceeding Mill Run,
 Pillsbury's Wheat Standard Middlings (B) with Ground Screenings not exceeding Mill Run,
 Pillsbury's XX Daisy.

Maurice Pincoffs Co., Chicago, Ill.

Pinco Brand Yellow Corn Germ Meal.

H. W. Pinkerton, N. S. Pittsburgh, Pa.

Eggo Dry Mash.

The Piqua Milling Co., Piqua, Ohio.

Wheat Bran,
 Wheat Middlings.

George P. Plant Milling Co., St. Louis, Mo.

"P" Wheat Bran with Screenings not exceeding Mill Run,
 "P" Wheat Middlings with Screenings not exceeding Mill Run,
 "P" Wheat Mixed Feed with Screenings not exceeding Mill Run.

Pottsville Feed Co., Pottsville, Pa.

Dried Brewers Grains.

Prairie State Milling Co. Chicago, Ill.

Emerald Horse Feed,
 Garland Chick Feed with Grit,
 Garland Chick Feed no Grit,
 Garland Scratch Feed with Grit,
 Garland Scratch Feed no Grit,
 Prairie State Alfalfa Meal,
 Prairie State Chick Feed, Coarse, With Grit,
 Prairie State Chick Feed with Grit,
 Prairie State Chick Feed no Grit,
 Prairie State Poultry Mash,
 Prairie State Scratch Feed with Grit,
 Prairie State Scratch Feed no Grit.

Pratt Food Co., Philadelphia, Pa.

Pratt's Baby Chick Food.

The Pratt Mills, Pratt, Kans.

Fancy White Middlings,
 Mixed Feed Screenings not over 10%,
 Standard Middlings,
 Wheat Bran & Screenings not over 10%.

Preston & Jacquish, Troy, Pa.

Corn & Oat Chop,
 Dry Mash,
 Scratch Grains.

Pennsylvania Food Co., Harrisburg, Pa.

Keystone Poultry Conditioner,
 Keystone Stock Conditioner.

Purity Oats Co., Davenport, Iowa.

Iowa Chick Feed,
 Iowa Dairy Feed,
 Iowa Scratch Feed with Grit,
 Iowa Scratch Feed no Grit,
 Iowa Stock Feed,
 Purity Reground Oat Hulls,
 Scattergood Chick Feed,
 Scattergood Dairy Feed,
 Scattergood Scratch Feed,
 Scattergood Stock Feed.

George W. Pusey, Ashland, Delaware,

Wheat Bran,
 Middlings.

Quaker City Flour Mills Co., Philadelphia, Pa.

Spring Wheat Bran,
 Spring Wheat Middlings,
 Winter Wheat Bran,
 Winter Wheat Middlings.

Quaker City Manufacturing Co., Philadelphia, Pa.

Quaker City Brand Beef Scraps.

The Quaker Oats Co., Chicago, Ill.

American Poultry Food,
 Buckeye Feed,
 Big Egg Scratch Grains,
 Boss Feed,
 C. O. & B. Feed,
 Early Bird Scratch Grains,
 Excelsior Feed,
 Pansy Scratch Grains without Grit,
 Schumacher Special Horse Feed,
 Schumacher Stock Feed,
 Sterling Horse Feed,
 Sterling Stock Feed,
 Victor Feed.

J. L. Rachau, Clintondale, Pa.

Corn & Oats Chop,
 Mixed Chop,
 Pure Corn Chop,
 Wheat Bran,
 Wheat Middlings.

M. G. Rankin & Co., Milwaukee, Wis.

Cottonseed Meal,
 Durham Dried Brewers Grains,
 Flour Middlings,
 Jersey Dairy Feed,
 Jersey Fancy Middlings,
 Jersey Fancy Mixed Feed,
 Jersey Hominy Feed,
 Jersey Horse Feed,
 Jersey Malt Sprouts,
 Jersey Stock Feed,
 Rye Feed,
 Wheat Bran with Ground Screenings not exceeding Mill Run,
 Wheat Middlings with Ground Screenings not exceeding Mill Run.

Purina Co., St. Louis, Mo.

Eagle A. Brewers Dried Grains,
 Good Luck Chick Feed,
 Good Luck Feed with Molasses,
 Good Luck Scratch Feed,
 O. A. Feed with Molasses,
 Protina Dairy Feed,
 Purina Alfalfa Meal,
 Purina Chick Feed,
 Purina Chicken Chowder Feed with Charcoal, Not over 1%,
 Purina Cow Chow Feed,
 Purina Dairy Feed,
 Purina Feed with Molasses,
 Purina Pigeon Food,
 Purina Sweet Feed,
 Purina Scratch Feed,
 Star Feed with Molasses,
 Success Chick Feed,
 Success Scratch Feed,
 Winner Chick Feed,
 Winner Feed with Molasses,
 Winner Scratch Feed,
 XX Good Feed with Molasses.

E. Raub & Sons Animal Feed Co., Indianapolis Ind.

Raub's Digester Tankage for Hogs,
 Raub's Meat Scraps for Poultry.

The W. T. Rawleigh Medical Co. Freeport, Ill.

Rawleigh's Poultry Powder,
 Rawleigh's Stock Tonic.

Reading Chemical Co., Reading, Pa.

Peerless Brand Poultry Meat.

Red River Milling Co., Fergus Falls, Minn.

Bran,
 Shorts.

- Red Star Mill & Elevator Co., Wichita, Kans.
Wheat Bran and Screenings,
Wheat Mixed Feed and Screenings.
Wheat Shorts and Screenings.
- Red Wing Linseed Co., Red Wing, Minn.
Red Wing Brand Ground Oil Cake.
- Red Wing Milling Co., Red Wing, Minn.
Bran With Ground Screenings not exceeding Mill Run,
Flour Middlings,
Reddog Flour,
Standard Middlings.
- Reece & Greenly, Millville, Pa.
Buckwheat Feed.
- Robert A. Reichard, Allentown, Pa.
Reichard's Blood Meal,
Reichard's Bone Granules,
Reichard's Bone Meal,
Reichard's High Grade Beef Scrap,
Reichard's Standard Beef Scrap.
- U. E. Replogle, Woodbury, Pa.
Horse Chop,
Mixed Chop,
Pure Bran,
Pure Wheat Middlings,
Pure Rye,
Pure Shelled Corn.
- Republic Milling Co., East St. Louis, Ill.
Black Beauty Horse Feed,
Black & White Dairy Feed,
Leader Horse Feed,
Republic Dairy Feed,
Republic Horse Feed,
Republic Poultry Feed,
Virginia Horse Feed.
- Robin Hood Mills, Ltd., Moose Jaw, Sask., Canada.
Robin Hood Oat Feed.
- George B. Robinson, Jr., New York, N. Y.
Cottonseed Meal,
Hominy Feed,
Linseed Oil Meal,
Robin Brand Cottonseed Meal.
- G. G. Rockwell, North Baltimore, O.
Wheat Bran with Ground Screenings not exceeding Mill Run,
Wheat Middlings with Ground Screenings not exceeding Mill Run
- John T. Rodgers, McVeytown, Pa.
Bran,
Chop,
Middlings.
- D. W. Romaine, Jersey City, Pa.
Boiled Beef & Bone.
- Rosekrans-Snyder & Co., Philadelphia, Pa.
Brewers Dried Grains,
Hominy,
Jenks Gluten,
Pilsner Brewers Dried Grains,
White Corn Bran.
- David Rummel, Mt. Union, Pa.
Rummel's Poultry Mash.
- Russell Grain Co., Kansas City, Mo.
Square Deal Alfalfa Meal.
- Russell-Miller Milling Co., Minneapolis, Minn.
Bran,
Flour Middlings,
Occident Wheat Feed,
Red Dog Flour,
Standard Middlings.

- Ryde & Co., Chicago, Ill.
Ryde's Cream Calf Meal.
- J. O. Ryder, Lock Haven, Pa.
Cackle Meat Scraps.
- Saeger Milling Co., Allentown, Pa.
Hanover Scratch Feed,
Hanover Wheat Bran with Ground Screenings not exceeding Mill Run,
Mixed Chop,
Pure Wheat Middlings.
- Saginaw Milling Co., Saginaw, Mich.
Ogemaw A A Pigeon Feed,
Red Hen Chick Starter,
Red Hen Scratch Feed,
Wolverine Scratch Feed.
- Saline Alfalfa Meal Co., Saline, Kans.
Alfalfa Meal.
- William G. Scarlett & Co., Baltimore, Md.
Oriole Brand AA Pigeon Feed,
Oriole Brand AAA Pigeon Feed,
Oriole Brand Beef Scraps,
Oriole Brand Chick Developer,
Oriole Brand Chick Starter,
Oriole Brand Dry Mash,
Oriole Brand Fish Scraps,
Oriole Brand Growing Mash,
Oriole Brand Meat Meal,
Oriole Brand Scratch Feed,
Oriole Brand Special Pigeon Feed.
- Scobie & Parker Co., Pittsburgh, Pa.
Premier Scratch With Grit,
Premier Scratch No Grit.
- The Scott County Milling Co., Sikeston, Mo.
Corn Bran,
Corn Chops,
Pure Wheat Bran,
Pure Wheat Shorts.
- Scott Logan Milling Co., Sheldon, Iowa.
Bran,
Shorts.
- Joseph Schlitz Brewing Co., Milwaukee, Wis.
Schlitz Purity Dried Grains.
- The Schmidt & Walker Co., Cincinnati, Ohio.
Snow King Hominy Feed.
- O. E. Schmucker, Watsonstown, Pa.
Cracker Jack Dairy Feed,
Schmucker's Complete Dairy Feed,
Schmucker's Stock Feed.
- Schneider Brothers Co., Mount Carmel, Pa.
Golden Brand Chick Feed,
Golden Brand Hen Feed,
Golden Brand Mash Feed,
Golden Brand Poultry Feed,
Golden Brand Stock Feed.
- H. N. Schooley & Son, Luzerne, Pa.
Hen's Delight Scratch Feed,
No. 1 Mixed Chop,
No. 2 Mixed Chop.
- Schuylkill Flour Mills, Leesport, Pa.
Wheat Offal.
- A. B. Seelye Medical Co., Abilene, Kans.
Seelye's Golden Belt Stock Tonic,
Seelye's Universal Condition Powder.
- Seneca Milling & Elevator Co., Seneca, Mo.
Pure Corn Chops.

- Shane Brothers & Wilson Co., Minneapolis, Minn.
 C. D. M. Wheat White Middlings,
 Cloverleaf Wheat Bran,
 King Midas Wheat Mixed Feed,
 Reddog Flour,
 Snowball Wheat White Middlings,
 Wheat Standard Middlings,
 Millbourne Bran,
 Millbourne Middlings.
- C. H. Sharpless, Bloomsburg, Pa.
 Henola Chick Feed,
 Henola Mash Feed,
 Henola Scratch Feed.
- Shellabarger Mill & Elevator Co., Salina, Kans.
 Wheat Bran & Screenings,
 Standard Wheat Shorts.
- Shredded Wheat Co., Niagara Falls, N. Y.
 Shredded Wheat Waste for Poultry.
- Sheffield-King Milling Co., Minneapolis, Minn.
 Brodflake Bran,
 Fairybok Middlings,
 Fancy Low Grade Flour,
 Gold Mine Feed,
 Red Dog Flour,
 Whitehope Middlings.
- Shepard, Clark & Co., Cleveland, Ohio.
 Coconut Oil Cake Meal,
 Sun Brand Cottonseed Meal.
- Sherwin-Williams Co., Cleveland, Ohio.
 S. W. C. Linseed Oil Meal.
- George L. Siegel, Erie, Pa.
 Government Mash.
- D. D. Simison, Volant, Pa.
 Rye Middlings,
 Wheat Bran,
 Wheat Middlings.
- The W. A. Simpson Co., Baltimore, Md.
 Chick Feed,
 Chick Starter,
 Champion Brand Scratch Feed,
 Meat & Bone Meal,
 Meat & Bone Scraps.
- P. A. & S. Small Co., York, Pa.
 Pearlcross Horse Feed,
 Pearlcross Chick Feed with Grit,
 Pearlcross Scratch Feed No Grit.
- J. W. Smith & Co., Pittsburgh, Pa.
 Ft. Pitt Heavy Grain Alfalfa Horse Feed.
- W. Newton Smith, Baltimore, Md.
 Red Letter Brand Cotton Seed Feed.
- J. E. Soper Co., Boston, Mass.
 Blue Ribbon Hominy Chop,
 Pilgrim Cottonseed Meal,
 Pioneer Cottonseed Meal.
- The Southern Cotton Oil Co., Charlotte, N. C.
 Aurora Cottonseed Meal,
 Bonita Cottonseed Meal,
 Boveta Cottonseed Hull & Meal Mixture,
 Piedmont Cottonseed Hull & Meal Mixture.
- Southern Fibre Co., Portsmouth, Va.
 Ko-Bos Dairy Feed.
- The Southwestern Milling Co., Kansas City, Mo.
 Bran,
 Fancy White Middlings,
 Brown Shorts.

Frank Souers, Nazareth, Pa.
Mixed Feed.

John T. Stahlnecker, Williamsport, Pa.
Spring Brnn.
Standard Middlings.

Standard-Tilton Milling Co., St. Louis, Mo.
Bran with Screenings not exceeding Mill Run.
Middlings with Screenings not exceeding Mill Run.

The Standard Cereal Co., Chillicothe, Ohio.
Logan Hominy Feed,
Standco Feed Meal,
Standco Hominy Feed,
Standco Middlings,
Standco Mixed Feed,
Standco Wheat Bran.

James F. Stanton & Sons, New Stanton, Pa.
Alfalfa Meal.
Fresh Ground Chop.
Green Meadow Dairy Feed,
Old Process Oil Meal,
Scratching Grains.

Star & Crescent Milling Co., Chicago, Ill.
Crescent Bran with Ground Screenings not exceeding Mill Run.
Crescent Middlings,
Star Bran with Ground Screenings not exceeding Mill Run.
Star Middlings with Ground Screenings not exceeding Mill Run,
Star Reddog Flour.

Stegmaier Brewing Co., Wilkes-Barre, Pa.
Dried Brewers Grains.

B. C. Stell, Norfolk, Pa.
Cottonseed Meal.

W. H. Stellmann, Baltimore, Md.
Brewers Dried Grains,
Malt Sprouts,
Rye Dried Grains,
Vinegar Dried Grains,
William H. Stellmann's Brewers Dried Grains.

Stewart Distilling Co., Highlandtown, Md.
Distillers Rye Grains.

F. W. Stock & Sons, Hillsdale, Mich.
Stock's Brnn.
Stock's Middlings,
Stock's Monarch Mixed Feed,
Stock's Superior Mixed Feed.

William H. Stokes Milling Co., Watertown, S. Dak.
Country Wheat Middlings with Ground Screening not exceeding Mill Run,
Wheat Bran with Ground Screenings not exceeding Mill Run.

Sparks Milling Co., Alton, Ill.
Trye Me Mixed Feed.

H. W. Spencer, Waverly, N. Y.
Omar Mixed Feed.

Sprague-Warner & Co., Chicago, Ill.
Cero Brand Poultry Feed,
Chico Brand Chick Feed.

Spratt's Patent Ltd., Newark, N. J.
Spratt's Bantum Food No. 4,
Spratt's Chicgrain,
Spratt's Chick Meal No. 5,
Spratt's Crissel,
Spratt's Egg Mash Food,
Spratt's Ground Meat,
Spratt's Growing Mash Food,
Spratt's Incubator or Baby Chick Meal No. 12,
Spratt's Pigeon Food No. 4,
Spratt's Pigeon Meal No. 5,
Spratt's Pheasant Food No. 3,

Spratt's Patent Ltd.—Continued.

Spratt's Pheasant Meal No. 5.
 Spratt's Pheasant Meal No. 12.
 Spratt's Poultry Food No. 3,
 Spratt's Scratch Food,
 Spratt's Turkey Food No. 3,
 Spratt's Turkey Meal No. 5,
 Spratt's Wild Duck Meal.

Suffern-Hunt Mills, Decatur, Ill.

Acme Hominy Feed.

The Sugarine Co., Peoria, Ill.

Ideal Dairy Feed,
 Suco Fat Maker,
 Sugarine Chick Feed,
 Sugarine Chick Feed with 5% Grit,
 Sugarine Dairy Feed,
 Sugarine Hog Meal,
 Sugarine Horse Feed with Alfalfa,
 Sugarine Horse & Mule Feed,
 Sugarine Scratch Feed,
 Sugarine Scratch Feed With 5% Grit,
 Universal Scratch Feed,
 Universal Scratch Feed With 5% Grit.

Sulzberger & Sons Co., Chicago, Ill.

Sulzberger's High Protein Meat Scrap,
 Sulzberger's High Protein Tankage,
 Sulzberger's Poultry Bone.

Swift & Co., Chicago, Ill.

Cottonseed Meal,
 Swift's Beef Meal,
 Swift's Blood Meal,
 Swift's Digester Tankage,
 Swift's Eureka Meat Scraps,
 Swift's Laymore Meat Scraps,
 Swift's Meat Meal,
 Swift's Meat Scraps,
 Swift's Poultry Bone,
 Swift's Soluble Blood Flour.

Swope Brothers, Johnstown, Pa.

Alfalfa Meal,
 Banner Chick Feed,
 Brewers Dried Grains,
 Dried Beet Pulp,
 Egg Maker Dry Mash,
 Excelsior Chicken Feed.
 Gluten Meal,
 June Pasture Dairy Feed,
 Old Process Oil Meal.

Syracuse Rendering Co., Syracuse, N. Y.

Syracuse Bone Meal for Cattle & Poultry,
 Syracuse Bone & Meat Meal for Poultry,
 Syracuse Cracked Bone for Poultry,
 Syracuse Poultry Food Prepared from Cooked Meat & Bone Scrap.

Tennant & Hoyt Co., Lake City, Minn.

Wheat Bran,
 Wheat Flour Middlings,
 Wheat Middlings,
 Wheat Red Dog Flour.

Tennessee Fibre Co., Memphis, Tenn.

Creamo Brand Cottonseed Feed.

Texas Cake & Linter Co., Dallas, Texas.

Sunset Brand Cottonseed Meal & Cake,
 Texoma Brand Cottonseed Meal & Cake,
 Texhoma Brand High Grade Choice Cotton Seed Cake and Meal.

Thompson & Co., Pittsburgh, Pa.

Oil Meal as Stock Food.

Thompson Milling Co., Lockport, N. Y.

Angelus Bran,
 Angelus Flour Middlings,
 Angelus Middlings,
 Angelus Mixed Feed.

Thornton & Chester Milling Co., Buffalo, N. Y.

T. & C. Wheat Bran,
T. & C. Wheat Coarse Middlings,
T. & C. Wheat Middlings,
T. & C. Wheat Mixed Feed.

Arnold A. Thurnau Grain & Feed Co., St. Louis, Mo.
Brewers Dried Grains.

Tioga Mill & Elevator Co., Waverly, N. Y.

Derby Chick Feed,
Derby Scratch Feed,
Tioga Chick Feed,
Tioga Dry Mash,
Tioga Growing Feed,
Tioga Poultry Grain,
Tioga White Middlings,
Waverly Flour Middlings.

Toledo Elevator, Toledo, Ohio.
Star Feed.

The Toledo Grain & Milling Co., Toledo, Ohio.

Camp's "A" Mixed Chop Feed,
Camp's "A" Yellow Chop Feed,
Camp's Corn & Oats Chop Feed,
Camp's C. O. & B. Chop Feed,
Camp's C. O. B. K. Chop Feed,
Camp's Corn Meal Stone Ground,
Camp's Keystone Chop Feed,
Camp's Little Wonder Chop Feed,
Camp's M. D. Chop Feed,
Camp's No. 1 Yellow Chop Feed,
Camp's Red Ball Chick Food,
Camp's Red Ball Scratch Feed without Grit,
Camp's Red Ball Scratch Feed with Grit,
Camp's Stock Feed,
Camp's No. 2 White Middlings & Corn Meal,
Camp's Wamba Chop Feed.

The Toledo Seed & Oil Co., Toledo, Ohio.
Major Brand Old Process Oil Meal.

Trenton Milling Co., Trenton, Ill.

Winter Wheat Middlings with Screenings not to exceed Mill Run,
Pure Winter Wheat Middlings with Screenings no to exceed Mill Run.

W. Trow Company, Madison, Ind.

Trow's Wheat Bran with Ground Screenings not exceeding Mill Run,
Trow's Wheat Middlings with Ground Screenings not exceeding Mill Run,
Trow's Wheat Mixed Feed with Ground Screenings not exceeding Mill Run.

The Ubiko Milling Co., Cincinnati, Ohio.

Fourx (XXXX) Distillers Dried Grains,
Ubiko Horse & Stock Feed,
Union Grains, Ubiko, Biles Ready Dairy Ration.

Union Brokerage & Commission Co., Vicksburg, Miss.
Durjan Brand Cottonseed Meal.
Magnolia Brand Cottonseed Meal.

The Union Grain & Coal Co., Anderson, Ind.

Diamond Hen Feed,
Melior Dairy Feed,
Star Chop Feed,
Union Alfalfa Meal,
Union Chick Feed,
Union Chop Feed,
Union Hen Feed,
Union Horse Feed,
Union Molasses Feed,
Universal Hen Feed.

Union Starch & Refining Co., Edinburg, Ind.
Union Corn Gluten Feed.

- Union Seed & Fertilizer Co., New York, N. Y.
American Red Tag Cottonseed Meal,
Yellow Tag Choice Cottonseed Meal.
- The United States Frumentum Co., Detroit, Mich.
Frumentum Hominy Feed.
- The U. S. Stock Food Co., Kansas City, Mo.
Alfalfa Meal,
Blue Bell Brand Horse & Mule Feed,
Eagle Brand Alfalfa-Molasses,
Eagle Brand Dairy Feed,
Eagle Brand Horse & Mule.
- United States Sugar Feed Co., Milwaukee, Wis.
U. S. Sugared Feed.
- George Urban Milling Co., Buffalo, N. Y.
Wheat Bran with Ground Screenings not exceeding Mill Run,
Wheat Middlings with Ground Screenings not exceeding Mill Run,
Wheat Mixed Feed with Ground Screenings not exceeding Mill Run.
- Valley City Milling Co., Grand Rapids, Mich.
Farmers Favorite Bran,
Farmers Favorite Cow Feed,
Farmers Favorite Middlings.
- The Victor Brewing Co., Jeannette, Pa.
Brewers Dried Grains.
- Voigt Milling Co., Grand Rapids, Mich.
Voigt's Pure Bran containing Mill Run Screenings,
Voigt's Pure Middlings,
Voigt's Mix Feed containing Mill Run Screenings.
- The Wadsworth Feed Co., Warren, Ohio.
Superior Dairy Feed,
Superior Horse Feed,
Superior Poultry Grains.
- C. W. Wagar & Co., Philadelphia, Pa.
Akin W. W. Bran,
Baltimore White Hominy Feed,
Bulk Wheat Bran,
Bulk Wheat Middlings,
Clover Leaf Mixed Feed,
Clover Leaf Shorts,
Hominy Feed,
Middlesex Corn Bran,
Middlesex Malt Grains,
Middlesex Oat Feed,
Middlesex Spring Mixed Feed,
Middlesex Winter Mixed Feed.
- Waggoner-Gates Milling Co., Independence, Mo.
Mill Run Bran,
Mixed Feed.
- Walters Milling Co., Philadelphia, Pa.
Brewers Grains,
Corn Bran,
Hominy Feed.
- The Warwick Co., Massillon, Ohio.
Bran (Winter Wheat),
Middlings (Winter Wheat).
- Washburn-Crosby Co., Minneapolis, Minn.
Adrian Red Dog Flour,
Rye Middlings,
Wheat Bran with Ground Screenings not exceeding Mill Run,
Wheat Flour Middlings with Ground Screenings not exceeding Mill Run,
Wheat Mixed Feed with Ground Screenings not exceeding Mill Run,
Wheat Standard Middlings with Ground Screenings not exceeding Mill Run.

The Wash-Co Alfalfa Milling Co., Fort Calhoun, Nebr.
 Alfalgreen,
 Birdseye Alfalfa Sugared Feed,
 Butlers Special Feed,
 None Better Horse Feed.

Washington Food & Chemical Co., Cleveland, Ohio.
 Washington Poultry Tonic,
 Washington Stock Tonic.

D. B. Wengerd, Elk Lick, Pa.
 Keystone Poultry Food.

The Otto Weiss Alfalfa Stock Food Co., Wichita, Kans.
 Otto Weiss Alfalfa Meal, (Coarse Ground for Stock),
 Otto Weiss Alfalfa Meal (fine Ground for Poultry),
 Otto Weiss Chick Feed,
 Otto Weiss Hen Feed,
 Otto Weiss Poultry Mash,
 Otto Weiss Stock Feed,
 Otto Weiss, Sweet Feed No. 1,
 Otto Weiss Sweet Feed No. 4.

Wels-Abbott-Nieman Co., Schuyler, Nebr.
 Low Grade Wheat Feed,
 Mixed Chopped Feed,
 Pure Rye Shorts,
 Pure Wheat Bran,
 Pure Middlings (Wheat),
 Pure Wheat Shorts,
 White Hominy Feed,
 Yellow Hominy Feed.

M. Weltin, Quincy, Ill.
 Weltin's Bran,
 Weltin's Middlings.

Wells Flour Milling Co., Wells, Minn.
 Feedwell Bran,
 Feedwell Flour Middlings,
 Feedwell Germ Middlings,
 Feedwell Lowgrade Flour,
 Feedwell Standard Middlings.

A. F. Wentz, Jersey Shore, Pa.
 Buckwheat Middlings,
 Corn, Oats, Rye & Barley Chop,
 Corn & Oats Chop,
 Hen Food,
 Wheat Bran,
 Wheat Middlings.

F. S. Wertz & Son, Reading, Pa.
 Faramel Horse Feed.

Western Grain Products Co., Hammond Ind.
 Chicago Alfalfa Horse & Mule Feed,
 Dried Corn Distillers Grains,
 Hammond Dairy Feed,
 Hammond Horse Feed,
 Malt Sprouts.

The Western Star Mill Co., Salina, Kans.
 Star Winter Wheat Bran & Middlings,
 Star Winter Wheat Bran & Screenings,
 Star Winter Wheat Middlings.

Wilbur Stock Food Co., Milwaukee, Wis.
 Wilbur's Calf Meal,
 Wilbur's Hog Tonic,
 Wilbur's Poultry Tonic,
 Wilbur's Stock Tonic.

The Williams Brothers Co., Kent, Ohio.
 Kent Mixed Feed,
 Pure Ohio Wheat Bran,
 Pure Winter Wheat Middlings.

Wilson Brothers, Buffalo, N. Y.
Malt Sprouts.

E. J. Woolworth, Kearney, Nebr.
Pure Alfalfa Meal.

E. S. Woodworth & Co., Minneapolis, Minn.
Flour Middlings,
Snow's Cream Flour Middlings.

Xtravim Molasses Feed Co., Boston, Mass.
Xtra-Vim Feed.

Yerxa, Andrews & Thurston, Inc., Minneapolis, Minn.
Bran,
Flour Middlings,
Golden Durum Wheat Flour Middlings,
Golden Mixed Feed,
Hector Durum Wheat Red Dog Flour,
Nokomos Durum Wheat Bran,
Nokomos Durum Wheat Middlings.

S. H. Young & Co., Philadelphia, Pa.
Oat Offal Feed.

Dr. T. D. Young's Stock Food Co., Media, Pa.
Young's Anti-abortion Food,
Young's Hog Food,
Young's Horse Food,
Young's Poultry Food.

Zenith Milling Co., Kansas City, Mo.
Pure Wheat Shorts,
Wheat Bran & Screenings not exceeding Mill Run.

ANALYSES OF SAMPLES OF FEEDING STUFFS RECEIVED FROM MANUFACTURERS AND PURCHASERS LO- CATED IN PENNSYLVANIA

The number of special samples of feeding stuffs sent to the Department for analysis by manufacturers, Purchasers and Dealers located in the State, was 225. These samples were sent for analysis for the purpose of determining whether or not the guarantees, which were claimed, were correct, to determine what guarantee should be used in labeling new brands of feeds being placed on the market and also in a number of cases, where cottonseed meals were suspected of being deficient in protein, to determine the amount of rebate which should be received by the Purchasers. In many cases inquiries were received with these samples with respect to the method of labeling required and whether or not possible adulterants were present. In every case, these requests, insofar as possible were complied with. As a number of samples of feeds were analyzed, especially to correct guarantees already being used, or to arrive at a proper formula or mixture for certain products, it is deemed inadvisable to publish the analysis of these special samples and, therefore, this information is not shown in this report.

DIRECTIONS FOR ANALYSIS OF SPECIAL SAMPLES

Parties desiring special samples of feed analyzed should carefully note the following directions:

Amount of sample: About one-half pound of the sample of feed to be analyzed should be carefully secured from a number of sacks, or where the feed is in bulk, from several different places in the bin, thoroughly mixed and placed in large mailing envelopes, bottles

or cartons or other containers usually used for mailing samples. A small amount of feed can be analyzed but better results are obtained on a half pound sample.

Charges for Analysis: A charge is made of one dollar (\$1.00) for each sample analyzed and determinations are made for protein, fat and fiber. The fee should be sent, with a letter accompanying sample and requesting the analysis to be made, in the form of a certified check, money order or cash.

Address: Both letters and samples should be addressed and sent to the Bureau of Chemistry, Pennsylvania Department of Agriculture, Box "R," Harrisburg, Pa. The name of the sender should be placed on the package containing sample.

OFFICIAL SAMPLES OF FEEDING STUFFS OBTAINED BY SPECIAL AGENTS

The Special Agents, of the Department, obtained 1,264 samples of feeds from Dealers located throughout the State. The number of counties, in which samples were taken, was 48. Two hundred and ninety-three towns and cities were visited and in many towns samples were not taken in order to avoid duplication and especially as samples representing similar brands had already been obtained in other or nearby localities. In addition to the taking of samples, shipments were inspected to determine whether or not sacks were in good condition and were printed, or printed cards attached, with the required information. All of these samples were analyzed for moisture, protein, fat and fiber and examined microscopically for ingredients and to determine their character with respect to freedom from possible adulterants or foreign materials. In the following table (No. I), will be found the names of the counties visited and the number of official samples secured in each.

TABLE I.—COUNTIES VISITED AND NUMBER OF SAMPLES SECURED IN EACH.

Name of County.	Number of Samples
Adams,	4
Allegheny,	76
Armstrong,	13
Beaver,	35
Bedford,	18
Berks,	26
Blair,	35
Bradford,	24
Butler,	36
Cambria,	40
Cameron,	8
Centre,	16
Chester,	24
Clearfield,	26
Clinton,	13
Crawford,	26
Cumberland,	12
Dauphin,	24
Elk,	24
Erie,	26
Fayette,	3
Forest,	10
Huntingdon,	26
Indiana,	26
Jefferson,	26
Juniata,	8
Lackawanna,	12
Lancaster,	67
Lawrence,	22
Lebanon,	25
Luzerne,	48
Lycoming,	34
McKean,	22
Mercer,	16
Mifflin,	22
Monroe,	8
Montour,	30
Northumberland,	2
Perry,	10
Philadelphia,	10
Potter,	31
Somerset,	12
Susquehanna,	50
Tioga,	18
Union,	21
Venango,	26
Washington,	63
Westmoreland,	44
York,	44
Total,	1,264

GUARANTEES AND DEFICIENCIES

The following table (No. II), has been prepared for the purpose of showing, in addition to the number of samples representing each class of feed analyzed, the number of samples guaranteed, the number deficient in both protein and fat, the number deficient in protein alone and those deficient in fat alone. The deficiencies noted are only those where it was found that the protein was 1.00 per cent. or

more below the guarantees and the fat one-half of 1.00 per cent. or more below the guarantees. In addition to the number of deficiencies noted in this manner, there were many samples which fell slightly below in protein and fat as compared with the amounts of these nutrients claimed, however, in the majority of cases the guarantees were considerably exceeded, showing in such cases that there was a desire on the part of the producers to guarantee their products as correctly as possible. Eleven hundred and eighty-eight samples were found to be guaranteed, as required. Of the 76 samples representing shipments, which were not labeled with the guaranteed analysis, the failure to furnish this information occurred, with a few exceptions, in whole grain feeds and pure wheat bran and middlings, where this information is not required. Compared with the results of the previous year, the proportion of deficiencies to samples guaranteed, remained about the same, showing a slight decrease although there was an increase in the number of samples which were found to be deficient in both protein and fat and in protein alone. Of the number guaranteed, 11 or .92 per cent. were found to be deficient in protein and fat, 53 or 4.46 per cent. were deficient in protein alone and 36 or 3.03 per cent. were deficient in fat alone. The total number of samples deficient in protein alone was 64 or 5.39 per cent. and the total number deficient in fat was 47 or 3.96 per cent. Of the feeds, where the Law required that guarantees be given, there was only a few cases, as will be noted, where these guarantees were not given and this condition shows a decided improvement in this respect over that noted during previous years of the inspection work. Many of these violations are due to neglect and carelessness on the part of those responsible for labeling and it is hoped that in the future these violations will be avoided. Care should be taken by dealers in unloading shipments of feeding stuffs, where cards are attached to sacks, to make sure that these cards are not lost or have become detached in transit. Where goods are shipped in bulk, care should be taken that proper cards are attached to the bins from which the feed is sold, furnishing the brand name and guaranteed analysis, as required, in order to avoid a conflict with those responsible for enforcing the requirements of the Law. In the following table, (No. II), showing the number of deficiencies, the classes of feeding stuffs have been arranged in the same order as in previous feeding stuffs reports and as they appear in the large table.

TABLE II.—CLASSIFICATION OF SAMPLES ANALYZED AND SUMMARY OF DEFICIENCIES.

Name of Feeding Stuffs.	Number of samples analyzed.	Number of samples guaranteed.	Deficient in protein and fat.	Deficient in protein alone.	Deficient in fat alone.
Cottonseed meal,	101	108	4	11	2
Linseed meal, N. F.,	2	2			
Linseed meal, O. F.,	22	22			
Cocoonut oil meal,	4	4		3	
Corn oil meal,	1	1			
Distillers' dried grains (largely from corn),	15	15			2
Distillers' dried grains (largely from rye),	1	1			1
Distillers' and yeast dried grains,	4	4			1
Brewers' dried grains,	20	20	1	2	
Malt sprouts,	2	2			
Corn gluten feed,	27	26			
Corn gluten meal,	2	2			
Hominy feed,	21	20			
Corn bran,	8	3			
Corn feed meal,	1	1			
Low grade flour,	2	1			
Wheat middlings,	26	20			
Wheat middlings with admixture,	44	44			2
Mixed feed; wheat by-product,	10	8			
Wheat bran,	27	15			
Wheat bran with admixtures,	49	48		1	
Mixed feed; rye byproducts,	1	1			
Wheat and rye middlings,	1	1			1
Oat feed,	1	1			
Oat hulls,	1	1			1
Buckwheat middlings,	2	1			
Buckwheat feed,	2	1			
Alfalfa meals,	10	10			
Dried beet pulp,	13	13			
Proprietary dairy feeds,	80	20	2	2	
Proprietary dairy feeds with molasses,	127	126	2	14	3
Proprietary stock, horse and mule feeds,	94	94		3	1
Proprietary stock, horse and mule feeds with molasses,	124	121		3	10
Proprietary calf meals,	12	12		1	
Proprietary swine feeds,	10	10		3	
Proprietary chop feeds,	48	48			1
Miscellaneous chop feeds,	26	15			1
Miscellaneous feeds,	2	1			
Proprietary poultry foods,	224	214	2	6	2
Animal by-products,	12	12		4	2
Condimental stock and poultry foods,	8	8			
Total,	1,264	1,128	11	53	26

AVERAGE ANALYSIS AND RETAIL PRICE.

Where 2 or more samples representing one kind, class or brand of feeding stuffs were received and analyzed, an average was estimated of the results secured and the retail price quoted, at the time the samples were secured. These feeds are included in the following table (No. III), in the order of their content of protein, those containing the highest amount of protein being placed first. While not all of the brands of feeds being sold in the State are represented and

while it is also recognized that an average of 2 samples of one brand or class of feeds does not fairly represent these products, it is believed the average composition and retail price shown in the following table will be of interest. They have also been arranged in classes according to their protein content; class 1 including those containing 30 per cent. to 48 per cent.; class 2, 20 per cent. to 30 per cent.; class 3, 15 per cent. to 20 per cent.; class 4, 10 per cent. to 15 per cent. and class 5, 3 per cent. to 10 per cent. The few samples of Animal By-products are included by themselves.

TABLE III.—AVERAGE ANALYSIS AND RETAIL PRICE.

Name of Feeding Stuff.	Moisture.	Protein.	Fat.	Fiber.	Price per ton.
Class 1 (30 per cent.—48 per cent. protein.)					
Staff brand high grade cottonseed meal,	8.43	47.51	7.25	7.50	\$35 00
Diamond corn gluten meal,	8.31	45.35	1.20	1.64	37 00
Tip Top Choice cottonseed meal,	8.20	43.25	7.35	9.22	38 00
Owl Brand High Grade, cottonseed meal,	8.33	43.10	7.22	8.65	33 50
Choice cottonseed meal, (Union Seed & Fert. Co.),	8.78	42.90	8.03	8.51	35 33
Dixie Brand cottonseed meal,	7.65	42.53	7.61	9.43	35 15
Canary Extra Brand Choice cottonseed meal,	8.29	42.28	8.24	8.75	34 60
Good Luck Brand cottonseed meal,	8.39	42.18	8.04	9.17	34 33
Bartlett's Michigan Farmer Brand cottonseed meal,	8.30	42.17	8.41	8.40	34 33
Cottonseed meal (total average),	8.12	41.71	7.77	9.72	34 44
Aurora Brand cottonseed meal,	7.81	41.22	8.77	10.65	34 60
Sun Brand Prime cottonseed meal,	8.09	40.85	7.14	11.07	35 50
Imperial Cotto Brand Choice cottonseed meal,	8.13	40.39	7.38	11.19	34 57
Buckeye Prime cottonseed meal,	7.78	40.23	7.04	10.70	34 10
Dirigo Brand cottonseed meal,	8.01	40.01	8.09	10.68	32 33
Orbale Brand Choice cottonseed meal,	8.39	39.54	7.81	11.14	35 01
Linseed meal, N. P. (total average),	8.45	39.07	2.58	8.71	29 00
Canary Brand Choice cottonseed meal,	7.50	39.03	9.26	10.50	36 00
Linseed meal (American Linseed Co.),	9.42	37.23	5.67	7.85	44 50
Pure linseed meal (The Mann Bros. Co.),	8.63	36.50	7.21	8.13	33 00
Linseed meal (The Metzgar Seed & Oil Co.),	9.01	34.94	6.48	8.57	42 50
Pure linseed meal (Spencer Kellogg & Sons, Inc.),	8.89	34.84	5.81	7.58	38 00
Linseed meal, O. P. (total average),	9.43	34.14	6.69	8.20	41 88
Oil Meal as Stock Food,	9.62	33.78	6.91	8.29	45 61
Amco linseed meal (American Mlx. Co.),	9.62	33.00	7.16	8.53	40 00
Linseed meal (The Toledo Seed & Oil Co.),	9.71	32.48	6.35	8.18	42 29
Eagle Three D. distillers' dried grains,	7.18	31.64	12.78	10.16	35 67
Distillers' dried grains (largely from Corn, T. A.),	6.97	31.43	11.67	10.60	35 27
Crown brewers' dried grains,	7.87	31.10	6.71	12.61	27 00
Ajax Flakes, distillers' dried grains,	7.14	30.91	11.14	10.67	35 00
Class 2 (20 per cent.—30 per cent. protein.)					
Brewers' dried grains (Reichard & Weaver),	7.25	29.78	7.22	10.24	30 00
Stockade Fancy brewers' dried grains,	7.09	28.69	7.06	14.13	28 50
Holstein brewers' dried grains,	7.11	28.54	6.78	14.09	28 33
Malt sprouts (total average),	3.78	28.53	1.28	11.74	29 00
Bull Brand brewers' dried grains,	6.85	28.06	6.93	13.21	31 40
Ox-O Pure Cane Molasses Concentrated Dairy Feed, ..	6.65	28.06	6.17	11.45	34 00
Peerless Brewers' dried grains,	7.13	27.97	7.15	13.52	28 50
Unicorn Dairy Ration,	7.07	27.62	7.11	10.56	36 00
Brewers' dried grains (total average),	7.06	27.55	6.90	13.49	28 63
Buffalo corn gluten feed,	8.73	27.53	3.00	7.03	31 59
Dewey's Ready Ration,	8.47	27.35	5.61	9.56	35 00
Clinton corn gluten feed,	8.78	27.00	3.80	6.59	31 00
International Cattle Feed,	10.62	26.35	7.25	9.38	33 50
Corn gluten feed (total average),	9.11	26.65	3.18	6.73	31 61
Larro-Mash,	9.63	25.60	5.34	7.84	46 00
Purity Milk Maker,	7.80	26.35	7.40	10.03	36 00
Sugarota Calf Meal,	10.22	26.22	5.82	5.04	30 00
Piel Bros. corn gluten feed,	8.95	26.19	3.86	6.31	31 75
Cream of Corn gluten feed,	9.75	26.13	2.61	6.16	32 50
Blue Ribbon Dairy Feed,	10.23	25.90	3.95	11.36	34 33
Union corn gluten feed,	8.85	25.63	4.76	4.28	30 00

TABLE III.—Continued.

Name of Feeding Stuff.	Moisture.	Protein.	Fat.	Fiber.	Price per ton.
Brewers' dried grains (M. F. Baringer),	7.47	25.57	7.09	15.15	30 00
Douglas corn gluten feed,	10.08	25.56	3.09	7.29	31 53
Mingo-Larrowe's High Protein for Dairy Cows,	8.51	25.52	4.32	11.91	35 60
Buckwheat Middlings (average),	12.71	25.31	6.59	4.06	32 50
Union Grains: Biles Ready Dairy Ration,	7.93	24.92	6.89	9.76	35 00
Blatchford's Calf Meal,	10.53	24.76	5.40	6.38	70 60
Justice Brand Scientific Creamery Feed,	8.84	23.92	5.73	9.56	33 50
Goldness Kalb brewers' dried grains,	6.52	23.13	6.24	12.61	28 00
Cocconut Oil Meal (total average),	7.86	22.41	9.85	9.09	38 00
Purina Dairy Feed,	12.63	21.32	3.90	15.56	31 46
Copra Cake Meal (Cocconut Oil Meal),	8.33	21.65	8.22	9.12	39 00
Ox-O No. 2 Pure Cane Molasses Dairy Feed,	6.88	21.50	6.22	14.28	27 50
H. & S. Alfalfa Feed for Milch Cows,	12.39	21.22	5.18	12.64	33 00
Best Mixed Feed for Cows,	10.52	21.06	4.98	7.06	33 00
Purina Chicken Chowder Feed with Charcoal,	9.59	20.33	4.57	8.55	50 00
Larrowe Feed,	8.86	20.62	4.11	12.49	34 05
Blue Ribbon Laying Mash,	9.50	20.56	5.84	9.41	44 00
Schumacher Calf Meal,	8.05	20.22	8.47	3.17	65 00
Distillers' and yeast dried grains,	6.92	20.17	7.15	16.88	30 80
Class 3 (15 per cent.—20 per cent. protein..)					
Blatchford's Pig Meal,	9.54	19.33	4.90	7.11	70 00
Blatchford's Milk Mash,	9.08	19.65	4.50	6.78	55 00
Ox-O Pure Cane Molasses Horse and Mule Feed,	8.59	19.63	4.71	10.57	31 60
Blatchford's Fill the Basket Egg Mash,	8.76	19.31	4.13	9.53	49 60
Balanced Ration Dairy Feed,	9.62	18.97	4.66	10.08	32 00
Crystaloid Dairy Feed,	10.19	18.68	4.79	11.87	25 50
Best Poultry Mash,	9.33	18.60	4.78	11.20	38 50
Lay or Bust Dry Mash,	9.83	18.28	3.94	7.32	47 00
Challenge Dairy Feed (Newsome Feed and Grain Co.),	14.24	18.13	4.85	10.08	31 00
Wheat Bran with Ground Screenings (Southwestern Mfg. Co.),	11.01	18.10	4.64	8.83	29 00
Palmo Midds,	5.95	18.07	9.39	6.34	28 00
Sugarine Dairy Feed,	9.70	17.81	4.76	12.26	27 00
Sucrene Dairy Feed,	11.71	17.66	4.94	11.81	27 13
Calf Meal (John W. Eshelman),	9.72	17.35	3.46	3.40	60 00
Wheat Middlings (average),	11.21	17.24	4.98	5.15	34 92
Anchor Wheat Bran with Ground Screenings,	10.76	17.13	4.63	9.59	30 67
Wheat Bran with Ground Screenings (The Larabee Flour Mills Co.),	11.05	17.04	4.29	8.96	28 67
Poland Wheat Standard Middlings and Ground Screenings,	10.40	16.94	5.53	8.35	22 60
Hammond Dairy Feed,	11.33	16.93	4.33	12.31	26 42
Protena Dairy Feed,	11.99	16.89	4.08	12.56	28 50
Wheat Bran with Ground Screenings (Crouch Bros. Co.),	18.86	16.81	5.42	8.53	23 60
Mixed Feed—Wheat by-products (average),	10.60	16.76	5.02	7.53	32 00
Low Grade Flour Middlings (average),	10.92	16.75	4.49	2.72	36 00
Buckeye Feed,	10.22	16.74	5.21	7.99	29 40
Radzer Dairy Feed,	13.49	16.68	5.17	11.89	26 80
Wheat Bran with Ground Screenings (Washburn-Crosby Co.),	11.06	16.63	5.19	9.89	31 60
Clover Leaf Dairy Feed,	13.62	16.59	3.94	11.61	27 05
Butterline Dairy Feed,	14.28	16.54	4.58	19.12	28 60
Dixie Dairy Feed,	14.91	16.52	4.64	12.01	30 00
Wheat Bran with Ground Screenings (total average),	10.44	16.34	4.89	9.61	28 96
Wheat Bran with Ground Screenings (Eckert Mfg. Co.),	10.65	16.21	4.59	9.07	29 00
Camp's No. 2 White Middlings and Corn Meal,	10.64	16.19	5.18	6.41	33 67
International Special Dairy Feed,	10.60	16.10	5.20	12.04	26 50
Wheat Bran with Ground Screenings (Maney Mfg. Co.),	9.75	16.10	4.82	10.11	28 60
Quaker Dairy Feed with Molasses,	11.70	16.08	4.50	11.62	27 22
Wheat bran (average),	10.41	16.00	4.96	9.53	28 39
Anchor Dairy Feed,	15.17	15.98	3.37	9.41	30 50
Arndy Dairy Feed,	14.31	15.85	3.29	12.04	26 75
Seal of Minnesota Wheat Bran with Ground Screenings,	9.39	15.50	5.14	10.33	28 00
Lake Shore Dairy Feed,	13.02	15.19	4.22	11.63	23 00
Gem Middlings,	10.40	15.15	6.68	4.21	36 50
B. & G.'s Mash Food,	8.00	15.10	3.83	5.45	45 50
Sucrene Hog Meal,	12.88	15.04	5.48	6.78	33 50
Class 4 (10 per cent.—15 per cent. protein.)					
Alfalfa meal (total average),	8.77	14.74	1.85	30.13	34 50
Spring Wheat Bran with Ground Screenings (The Cleveland Mfg. Co.),	9.07	14.60	5.00	10.01	27 00
Golden Grain Dairy Feed,	13.70	14.53	3.81	12.18	37 00
Tip Top Sugared Feed,	11.57	14.41	4.95	12.35	24 67

TABLE III.—Continued.

Name of Feeding Stuff.	Moisture.	Protein.	Fat.	Fiber.	Price per ton.
Peters' Lusarne Alfalfa Meal,	9.10	14.32	1.74	30.79	23 00
Badger Fancy Middlings,	9.80	12.28	7.58	4.30	24 75
Buckwheat Feed (average),	11.04	18.11	3.44	29.22	25 00
Tuxedo Chop,	15.39	12.04	3.86	8.74	36 67
Otto Weiss Stock Feed,	9.48	12.82	3.73	11.45	28 00
Poultry Mash (Miner-Hillard Mfg Co.),	9.32	12.77	4.48	7.68	41 40
Acme Horse Chop,	10.31	12.57	6.51	5.80	36 50
Best Mixed Feed for Horses,	10.44	12.50	5.52	5.01	38 00
Mixed Feed (C. P. Matthews & Sons, Inc.),	9.52	12.47	7.82	4.53	37 00
Choice Steam Cooked feed,	9.09	12.22	7.50	3.98	36 00
Stock Feed (John W. Eschelman),	9.00	12.07	5.00	9.47	30 50
Hominy Feed (Mystic Mfg. Co.),	10.00	11.97	7.00	4.52	35 50
Emco Evans hominy feed,	9.51	11.83	9.43	4.94	32 30
Acme hominy feed,	9.67	11.81	9.63	5.07	31 75
Emerald Horse Feed,	16.32	11.81	1.60	10.73	34 00
Badger hominy feed,	9.49	11.78	8.17	5.23	32 00
Hominy feed (total average),	9.83	11.74	8.49	4.55	34 00
Challenge hominy feed,	10.48	11.72	7.10	5.52	32 00
Schumacher Stock Feed,	9.98	11.67	4.49	9.71	33 64
Mihimico Stock Feed,	9.60	11.60	4.74	6.53	35 00
Dickinson's Hobby Horse Feed,	16.38	11.58	2.12	10.77	35 00
Kingalfa Horse Feed,	16.87	11.58	2.35	10.44	31 20
Green Meadow Dairy Feed,	16.87	11.54	0.92	16.32	28 00
Sterling Stock Feed,	9.09	11.46	4.22	9.61	33 00
Globe Scratch Feed—No Grit,	12.57	11.43	3.43	2.86	44 00
Pearl hominy feed,	9.44	11.41	8.47	4.32	37 00
Logan hominy feed,	8.46	11.41	8.94	4.53	31 00
Yellow hominy feed (The Quaker Oats Co.),	11.84	11.40	8.68	8.06	37 30
C. O. & E. Feed (The Quaker Oats Co.),	9.51	11.38	3.96	9.53	35 00
Anchor Brand Scratch Feed,	12.46	11.32	3.64	3.05	43 50
Pioneer Scratch Feed,	11.26	11.28	3.13	2.94	40 00
Purina Scratch Feed,	12.16	11.25	3.45	2.61	45 40
Poultry Rations (Spanogle-Yeager Mfg. Co.),	12.23	11.19	3.24	2.70	45 00
Horse Power Brand Feed,	14.96	11.13	2.69	8.74	34 50
Purina Chick Feed,	12.87	11.13	3.30	3.84	55 00
Cluck-Cluck Scratch Feed,	12.38	11.10	3.44	3.02	43 00
Quaker Chick Feed—No Grit,	12.70	11.05	3.54	2.93	54 00
Kay Horse and Mule Feed,	17.99	11.00	1.42	11.19	34 50
Pine Tree Scratch Feed—No Grit,	12.59	11.00	2.55	2.56	41 00
Red Ribbon Chick Feed,	12.11	11.00	3.19	2.25	53 00
Buffalo Stock Feed,	10.80	11.00	4.28	7.19	34 30
Gloscoat Horse Feed,	17.00	10.99	2.18	12.47	35 00
Quaker Scratching Grains—No Grit,	12.51	10.98	3.42	2.53	43 30
Peerless Alfalfa Horse Feed,	16.52	10.95	1.93	11.41	34 00
Red Comb Poultry Feed—No Grit,	12.38	10.83	3.51	2.77	45 40
Erskine State Scratch Feed—No Grit,	12.70	10.82	4.51	4.30	39 00
Equality Scratch Feed,	12.44	10.83	3.96	2.13	45 00
Badger Horse Feed,	17.39	10.83	2.22	10.01	33 00
Oblick Feed—No Grit (John W. Eschelman),	12.25	10.75	4.57	2.54	55 00
International Dan-Patch Special Horse Feed,	16.63	10.73	2.47	12.53	33 67
Corn, Oats and Barley Chop (average),	12.70	10.69	3.85	2.40	35 30
No. 1 Chop Feed,	10.30	10.69	4.12	6.05	33 00
White Cross Scratch Feed,	12.50	10.63	3.36	2.60	39 00
Schumacher Little Chick Feed,	11.28	10.60	3.53	2.53	44 00
Corn and Oats Chop (average),	11.27	10.58	4.64	4.57	36 71
Camp's Stock Feed,	10.64	10.57	4.04	9.21	33 00
Challenge Stock Feed (Newsome Feed and Grain Co.),	9.30	10.55	5.79	9.44	28 57
Alfalfa Horse Feed (John W. Eschelman),	15.94	10.48	2.00	10.71	33 75
Badger Stock Feed,	8.32	10.46	5.49	10.30	31 67
Ben Hur Horse and Mule Feed,	17.28	10.43	2.89	9.87	28 50
Blended Hen Food,	12.42	10.41	3.49	3.46	48 00
Quaker Scratch Grains with not to exceed Oyster Shells or Marble Grit 6 per cent.,	11.96	10.33	2.04	2.51	39 00
Scratch Feed—No Grit (John W. Eschelman),	13.15	10.28	3.19	2.05	41 67
Chick Feed—5 per cent. Grit,	12.91	10.25	4.75	2.06	41 32
Perfection Horse Feed,	15.04	10.33	2.10	12.47	34 00
Golden Grain Horse and Mule Feed,	15.05	10.33	2.44	10.70	33 50
Special Scratch Feed (Miner-Hillard Mfg. Co.),	13.00	10.29	3.08	2.40	46 00
Garland Scratch Feed—With Grit,	11.81	10.23	3.26	2.33	41 00
Harteno Horse Food,	14.86	10.21	2.98	4.50	43 00
Corn bran (total average),	9.07	10.06	6.35	7.75	32 32
Dixie Horse and Mule Feed,	16.50	10.07	2.85	9.43	35 43
Faramel Horse Feed,	16.39	10.03	3.61	5.07	41 00
Class 5 (3 per cent.—10 per cent. protein.)					
Green Cross Horse Feed,	17.19	9.95	2.55	10.53	34 54
John-Hen Poultry Feed,	12.29	9.85	2.49	8.04	42 69
Hart's Competition Horse Food,	15.46	9.80	3.61	5.38	39 40
Scratch Feed—5 per cent. Grit (John W. Eschelman),	12.40	9.77	2.39	2.43	43 67
Furitan Horse and Mule Feed,	16.80	9.76	2.10	12.13	34 50

TABLE III.—Continued.

Name of Feeding Stuff.	Moisture.	Protein.	Fat.	Fiber.	Price per ton.
Purina Feed with Molasses,	16.17	9.69	2.50	9.53	35 56
Mixed Chicken Feed,	11.53	9.63	3.11	2.80	40 00
White Diamond Feed,	9.53	9.47	4.28	8.10	23 00
Portage Stock Feed,	8.58	9.46	4.85	11.45	31 17
Challenge Horse Feed (The D. H. Owen Co.),	18.85	9.36	2.55	12.01	21 00
Premium Chop,	9.03	9.29	3.99	8.17	21 00
Victor Feed,	10.77	9.26	4.93	7.68	32 60
Acme Feed,	11.01	9.23	3.98	5.73	35 60
Camp's C. O. and B. Chop Feed,	10.25	9.20	4.10	7.93	33 20
Hoss Feed,	9.54	9.19	4.90	9.37	34 00
Pioneer Stock Feed,	8.91	9.19	4.19	7.48	34 60
Camp's M. D. Chop Feed,	10.19	9.13	3.92	8.06	32 50
Dried beet pulp (The Larrowe Mfg. Co., average),	8.48	9.09	1.10	18.83	29 00
Camp's Little Wonder Chop Feed,	10.07	9.00	3.91	7.93	32 92
Hamlin's Quality Feed,	19.33	8.95	3.04	10.25	35 00
Cream City Horse Feed,	19.37	8.95	1.60	8.43	32 60
Corn Chop (average),	13.10	8.92	3.70	2.94	34 67
Hamlin's Purekane Molasses Feed,	20.52	7.44	2.20	5.80	23 50
Oat Feed (largely oat hulls), (average),	6.38	7.44	3.24	22.82	22 83
Extra-Vim Feed,	21.48	4.82	0.59	4.88	35 20
Animal By-Products.					
Berg's 3 Medal Beef Scraps,	8.86	61.54	4.45	2.51	50 00
Darling's High Protein Meat Scraps for Poultry,	7.44	57.66	5.55	3.43	63 60
Ground Beef Scraps for Poultry (J. W. Eshelman),	8.46	53.60	11.91	1.21	66 00
Berg's 3 Medal Poultry Meat,	7.34	36.19	15.33	1.83	67 60

AVERAGE COMPOSITION, DIGESTION COEFFICIENTS AND ENERGY VALUES OF FEEDING STUFFS

In the feeding stuffs report for 1910 a table was included showing the average composition of feeding stuffs and their digestion coefficients or percentage of digestive nutrients where this information had been obtained, and in the report for 1912 a table was also included showing the number of pounds of digestible protein and therms of energy in one hundred pounds of those feeding stuffs for which this data had been established by experiments. Inasmuch as the Department receives requests for this information from time to time and as these former reports are limited, the following table (No. IV), has been prepared, giving the composition, digestion coefficients and therms of energy for those feeds where this information is available. A few additional feeds are included which have recently been utilized for feeding purposes and the figures given were obtained by the Chemical Laboratory of this Department. These results, while not representing a large number of samples, will prove of interest and include the following: Ivory Nut Meal 2 samples, Corn Oil Cake Meal 1 sample, and Yeast Dried Grains 4 samples. The analysis of

Cottonseed Meal included represents an average of the results obtained by the Department, upon analysis of 525 samples, covering a period of 11 years work, those for distillers grains from corn an average of 145 samples covering 11 years results and those shown for distillers dried grains from rye represent an average of 22 samples received during the past 7 years. The other figures given for the various products were taken from authorities on the subject as indicated by the foot-note at the bottom of the table. The digestion coefficients were obtained by actual feeding experiments as were also the energy values shown in the last column of "Therms of Energy." The energy values have not been determined in all classes of feeding stuffs, which explains the reason why they are only given for a few products. The information given in table IV will be of value to those who desire to estimate the amount of digestible nutrients and the nutritive ratios in the dairy rations which are being used as well as to determine the therms of energy in such rations where these figures are available. The digestion coefficients represent the percentage amount of digestible protein, fat and carbohydrates (fiber and nitrogen free-extract) in one hundred pounds of feed. By multiplying the percentage of protein, fat and carbohydrates, therefore, by their respective coefficients the percentages of digestive nutrients will be obtained. To obtain the nutritive ratio of a feed, after having determined the digestible nutrients in the same by use of the coefficients, multiply the per cent. of digestible fat by 2.4, add this to the per cent. of digestible carbohydrates and divide the sum obtained by the per cent. of digestible protein. For complete information and directions with respect to estimating nutritive ratios and maintenance and producing rations by use of energy values and digestible protein, authorities on the subject should be consulted as this field is too broad to include complete information in this report.

TABLE IV.—AVERAGE COMPOSITION, DIGESTION, COEFFICIENTS AND ENERGY VALUES OF FEEDING STUFFS.

Name of Feeding Stuff.	Composition.						Digestion Coefficients					Therms of energy.
	Water.	Ash.	Protein.	Fat.	Carbohy- drates.		Protein.	Fat.	Carbohy- drates.			
					Fiber.	Nitrogen — free extract.			Fiber.	Nitrogen — free extract.		
Alfalfa meal,	8.4	7.4	14.3	2.2	25.0	42.7	74	41	.....	*57	34.41
Barley,	10.9	2.4	12.4	1.8	2.7	69.8	70	89	60	*92	80.76	
Barley meal,	11.9	2.6	10.5	2.2	6.5	63.3	70	89	.....	*90	.....
Barley screenings,	12.2	3.6	12.3	2.8	7.3	61.8	.....	.....	.....	.....	.....
Beet pulp-dried,	8.0	5.4	9.5	0.4	15.4	61.3	64	.....	.....	*89	60.10
Brewers' dried grains, ..	.....	3.6	19.9	5.6	11.0	51.7	79	91	53	*59	60.01
Broom corn seed,	12.7	3.4	10.2	3.0	7.1	63.6	73	97	.....	*68	.....
Buckwheat,	12.6	2.0	10.0	2.2	8.7	64.5	77	82	.....	*61	.....
Buckwheat bran,	10.5	3.0	12.4	3.3	31.9	33.8	60	68	.....	*43	.....
Buckwheat hulls,	13.2	2.2	4.6	1.1	43.5	35.3	46	55	.....	*35	.....
Buckwheat middlings, ..	13.2	4.8	26.9	7.1	4.1	41.9	76	76	.....	*73	75.92
Buckwheat shorts,	11.1	5.1	27.1	7.6	8.3	40.8	78	72	.....	*68	.....
Cocoa hulls,	4.5	12.9	18.5	3.5	16.7	42.9	12	100	51	*73	.....
Cocoonut oil cake meal, ..	10.3	5.9	19.7	11.0	14.4	33.7	79	95	.....	*72	.....
Cocoonut shells, ground, ..	8.7	0.6	1.3	0.4	49.5	29.5	.....	.....	.....	.....	.....
Corn,	10.9	1.5	10.4	5.0	2.0	70.2	76	86	58	*93	88.84	
Corn bran,	9.1	1.3	9.0	5.8	12.7	62.0	82	79	.....	*10	.....
Corn cob,	10.7	1.4	2.1	0.5	30.1	54.9	17	50	65	*60	.....
Corn and cob meal,	16.1	1.5	8.5	3.5	6.6	64.8	62	84	46	*88	72.06	
Corn germ meal,	8.1	1.3	11.1	7.1	9.9	62.5	81	87	.....	*85	.....
Corn gluten feed,	8.5	1.7	26.2	3.1	7.2	53.3	85	83	72	*87	79.82	
Corn gluten meal,	8.2	0.9	29.3	11.9	3.3	46.5	88	98	.....	*87	88.80
Corn meal,	15.0	1.4	9.2	3.8	1.9	63.7	60	92	.....	*98	.....
Corn oil cake meal,	7.5	2.7	28.0	11.5	7.4	43.1	.....	.....	.....	.....	.....
Cottonseed,	10.3	3.5	18.4	19.9	22.2	24.7	68	87	76	*50	.....
Cottonseed hulls,	11.1	2.8	4.2	2.2	46.3	33.4	71	77	.....	*42	.....
Cottonseed meal,	7.6	7.2	41.0	8.1	9.2	26.9	83	92	32	*64	84.20	
Distillers' dried grains (from corn),	6.4	1.7	30.4	12.7	11.0	37.8	73	95	.....	*85	79.23
Distillers' dried grains (from rye),	6.8	1.8	18.8	8.4	13.2	51.0	60	.....	.....	.....	60.98
Dried blood,	8.5	4.7	84.3	2.5	.....	.....	72	92	.....	.....	.....
Fish scrap,	10.8	29.2	48.4	11.6	.....	.....	91	89	.....	.....	.....
Flaxseed,	9.2	4.3	22.6	33.7	7.1	23.2	91	86	61	*56	.....
Flaxseed screenings,	5.3	11.7	17.2	15.7	11.1	39.0	.....	.....	.....	.....	.....
Flax plant refuse,	5.9	6.9	6.8	3.6	42.6	34.2	.....	.....	.....	.....	.....
Hominy feed,	11.1	2.5	9.8	8.3	3.8	61.5	77	82	.....	*81	84.00
Ivory nut meal,	8.2	1.2	4.7	0.9	8.2	76.8	.....	.....	.....	.....	.....
Kafir corn,	9.3	1.5	9.9	3.0	1.4	74.9	79	70	.....	*76	.....
Linseed oil meal (new pro- cess),	10.1	5.9	33.2	3.0	9.5	34.4	85	93	74	*88	74.67	
Linseed oil meal (old pro- cess),	9.2	5.7	32.9	7.9	8.9	35.4	89	89	57	*78	78.92	
Malt sprouts,	10.2	5.7	23.2	1.7	10.7	48.5	80	100	34	*69	46.32	
Meat scraps,	10.7	4.1	71.2	13.7	.....	0.3	93	98	.....	.....	.....
Millet seed,	14.0	3.3	11.8	4.0	9.5	57.4	75	80	.....	*67	.....
Molasses (cane, black strap),	22.4	9.3	2.4	.....	.....	65.9	.....	.....	.....	*66	.....
Molasses (beet),	20.8	10.6	9.1	.....	.....	59.5	.....	.....	.....	*60	.....
Oats,	11.0	3.0	11.8	5.0	9.5	59.7	78	83	20	*76	66.27	
Oat bran,	7.1	5.4	12.4	5.5	16.7	62.9	.....	.....	.....	.....	.....
Oat clips,	6.7	11.5	9.4	3.8	21.3	47.3	.....	.....	.....	.....	.....
Oat hulls,	7.3	6.7	3.3	1.0	29.7	52.1	39	60	.....	*48	.....
Oat shorts,	7.7	3.7	16.0	7.1	6.1	59.4	78	39	.....	*72	.....
Pea meal,	10.0	2.6	18.9	1.6	17.5	49.4	83	56	.....	*76	71.75
Peanut bran,	9.6	3.5	17.1	25.4	10.6	33.8	.....	.....	.....	.....	.....
Peanut hulls,	9.0	3.4	5.6	1.6	64.3	17.1	71	91	.....	*20	.....
Peanut meal,	10.7	4.9	47.6	8.0	5.1	23.7	90	86	.....	*79	.....
Rice,	12.4	0.4	7.4	0.4	0.2	79.2	81	75	.....	*91	.....
Rice bran,	9.7	10.0	12.1	8.8	9.5	49.9	44	83	.....	*76	.....
Rice hulls,	9.0	18.3	3.5	0.5	41.9	26.8	23	40	.....	*21	.....
Rice meal,	10.2	8.1	12.0	13.1	5.4	51.2	63	86	26	*86	.....

TABLE IV—Concluded.

Name of Feeding Stuff.	Composition.						Digestion Coefficients				Therms of energy.
	Water.	Ash.	Protein.	Fat.	Carbohy- drates.		Protein.	Fat.	Carbohy- drates.		
					Fiber.	Nitrogen — free extract.			Fiber.	Nitrogen — free extract.	
Rice polish,	10.0	6.7	11.7	7.3	6.3	53.0	77	89	.....	*88	.....
Rye,	11.6	1.9	10.6	1.7	1.7	72.5	86	65	.....	*81	81.72
Rye bran,	11.6	3.6	14.7	3.3	3.5	63.3	78	71	.....	*76	56.65
Rye shorts,	9.3	5.9	13.0	2.3	5.1	59.9	66	57	.....	*69	.....
Soja (Soy) bean seed,	10.3	4.7	24.0	16.9	4.3	28.3	87	85	.....	*86	.....
Sorghum seed,	12.3	2.1	9.1	3.6	2.6	69.3	77	86	.....	*72	.....
Sunflower oil cake,	10.3	6.7	32.3	9.1	13.5	27.1	96	97	.....	*48	.....
Sunflower seed,	8.6	3.6	16.3	21.2	29.9	21.4	74	89	.....	*41	.....
Tankage,	7.0	15.7	44.1	13.6	7.2	9.4	.....	.....	.....	.....	.....
Wheat,	10.5	1.3	11.9	2.1	1.3	71.9	86	81	.....	*84	82.63
Wheat bran,	11.9	5.3	15.4	4.0	9.0	53.9	79	68	23	69	48.23
Wheat low grade flour middlings,	12.0	2.0	18.0	3.3	0.9	63.3	46	24	.....	*88	.....
Wheat middlings,	11.6	2.9	12.5	3.0	4.9	65.1	73	73	.....	*73	.....
Wheat screenings,	11.6	2.9	12.5	3.0	4.9	65.1	73	73	.....	*73	.....
Wheat shorts,	11.3	4.6	14.9	4.5	7.4	56.3	82	84	.....	*78	.....
Yeast dried grains,	6.3	3.7	20.3	7.3	17.4	44.0	.....	.....	.....	.....	.....
Roughage.											
Barley straw,	14.2	5.7	3.5	1.5	36.0	39.0	20	42	56	54	.....
Buckwheat straw,	9.9	5.5	5.2	1.3	43.0	35.1	.....	.....	.....	.....	.....
Canada blue grass,	14.0	4.3	5.9	0.9	32.3	42.1	42	33	.....	*65	.....
Clover hay, alsike,	9.7	3.3	12.3	2.9	25.6	40.7	66	50	53	71	.....
Clover hay, crimson,	9.6	3.6	15.2	2.3	27.2	36.6	69	44	45	62	.....
Clover hay, red,	15.3	6.2	12.3	3.3	24.3	33.1	49	43	43	53	34.74
Corn fodder,	42.2	2.7	4.5	1.6	14.3	34.7	55	74	65	73	12.44
Corn silage,	79.1	1.4	1.7	0.3	6.0	11.0	53	37	.....	*66	18.56
Corn stover,	40.5	3.4	3.3	1.1	19.7	31.5	45	63	67	61	26.53
Kentucky blue grass hay, ..	21.2	6.3	7.3	3.3	22.0	37.3	62	51	.....	*61	.....
Oat straw,	9.2	5.1	4.0	2.3	37.0	42.4	30	33	54	44	21.21
Orchard grass hay,	9.9	6.0	3.1	2.6	32.4	41.0	60	54	.....	*63	.....
Red top hay,	8.9	5.2	7.9	1.9	23.6	47.5	61	53	.....	*63	.....
Rye straw,	7.1	3.2	3.0	1.2	33.9	45.6	21	32	30	37	29.37
Timothy hay,	12.3	4.4	5.9	3.5	29.0	45.0	43	57	52	59	23.54
Wheat straw,	9.6	4.2	3.4	1.3	33.1	43.4	11	31	52	38	19.56

Above figures from W. A. Henery's "Feeds and Feeding," W. H. Jordan's "The Feeding of Animals," J. B. Halligan's "Stock Feeds and Feeding," Bulletin No. 114 Penna. Experiment Station, Bulletin No. 153 Mass. Experiment Station, Farmers' Bulletin No. 346 U. S. Dept. of Agriculture and Feeding Stuffs reports of Penna. Department of Agriculture.

*Digestion co-efficients for carbohydrates (nitrogen-free extract and crude fiber estimated together.)

DISCUSSION OF THE ANALYTICAL RESULTS

All of the official samples of feeding stuffs received, analyzed and examined microscopically during the year have been classified as shown in table II and the results obtained, together with their brand name and guarantees, have been listed in the large table (No. V) in this order of classification. The following remarks pertaining to each class of feeds, are also considered in this order. Under each class or heading will be found the page numbers of the large table where the detailed results of analysis will be found. The average results referred to represent two or more samples of the same brand, kind or class of feed. The deficiencies shown include only those cases, as indicated in table II, where the protein was found to be 1.00 per cent. or more below the guarantees and where the fat was one-half of 1.00 per cent. or more below the guarantees.

OIL CAKE MEALS

COTTONSEED MEAL

Analyses on Pages 84 to 93

There were 103 samples of cottonseed meal received and analyzed all of which were found to represent guaranteed shipments. Of this number, 4 upon analysis, were found to be deficient in both protein and fat, 11 deficient in protein alone and 2 deficient in fat alone. There were 41 brands guaranteed with "sliding guarantees" for protein and fat and of this number there were only 6 which met the higher guarantees and 15 failed to meet the lower guarantees. Of the remaining number of samples, where single guarantees were used, 18 failed to meet these guarantees. The guarantees for protein ranged from 38.00 per cent. to 46.00 per cent. The analysis of all of the samples of meal gave the following results for protein: lowest 36.06 per cent., highest 50.88 per cent., average 41.71 per cent. Fat: lowest 5.95 per cent., highest 10.77 per cent., average 7.77 per cent. Fiber: lowest 5.01 per cent., highest 14.18 per cent., average 9.72 per cent.

In many of the samples analyzed the protein content considerably exceeded the guarantees. A comparison of the results secured on

those brands of meal where two or more samples were received, considering the average contents of protein and fat and the average retail price will be of interest. The lowest average retail price was \$34.00 a ton with 49.99 per cent. of combined protein and fat, the highest average retail price was \$38.00 a ton with 50.60 per cent. of protein and fat. The greatest amount of protein and fat was 51.76 per cent., which sold at an average retail price of \$35.00 a ton and the lowest amount of protein and fat was 47.27 per cent. having an average retail price of \$34.10 or only \$.90 less than the brand of meal, which contained 47.27 per cent. of protein and fat or 2.51 per cent. more of combined nutrients. An average of all the samples gave 49.48 per cent. of protein and fat and an average retail price of \$34.44 a ton. While average figures do not always accurately indicate the price and composition situation, it is evident that, from the information secured, there is not such a difference in the price of cottonseed meal as there is in the composition and Consumers should be convinced that, as a general rule, it is cheaper to buy the high grade meals.

It is also evident that "sliding guarantees" for protein and fat are misleading and do not indicate with any degree of certainty that these meals, upon analysis, will meet such guarantees. Some Manufacturers and Jobbers make a practice of selling meal on the basis of a high guarantee for protein claiming to make a rebate to the purchaser if, upon analysis of samples, the protein is found to be deficient. The Department does not believe that this method of making sales is good policy for the reason that the results of inspection do not show the high guarantees to be always maintained and further because consumers do not have the time, or care to go to the trouble of having samples analyzed and consequently the purchaser does not know whether the meal he is using is of the quality claimed. Consumers of cottonseed meal should carefully study the results of analysis and purchase those brands which are manufactured by responsible firms, where it is shown that it is the rule, rather than the exception, for the guarantees to be correct.

LINSEED MEAL

Analyses on Pages 92 to 95

The number of samples of linseed oil meal received and analyzed was 34, all of which were found to be guaranteed, no deficiencies being observed.

There were only two samples of new process meals which, upon analysis, gave the following results: Protein 39.07 per cent., fat

2.58 per cent. and fiber 8.71 per cent. Both were guaranteed 36.00 per cent. protein, one analyzed 37.75 per cent. and the other 40.38 per cent.

The number of old process meals was 32 and the results of analysis showed that, as a rule, the guarantees were considerably exceeded. There were 9 brands represented and in only one sample did there appear to be any amount of foreign material or residue from screenings. The protein varied from 30.31 per cent. to 38.25 per cent. with an average of 34.14 per cent.; the fat varied from 5.35 per cent. to 8.28 per cent. with an average of 6.69 per cent. and the fiber varied from 4.18 per cent. to 9.96 per cent. with an average of 8.20 per cent.

COCOANUT OIL MEAL

Analyses on Pages 94 and 95

The residue from the meats of the cocoanut after the extraction of the oil is now being offered for sale as cocoanut oil meal and during the year 4 samples of this product were secured. There was little variation in their composition although 3 samples were found to be deficient in protein alone owing to the fact that too high guarantees were given. The protein varied from 20.50 per cent. to 22.50 per cent. with an average of 22.41 per cent.; the fat varied from 7.72 per cent. to 9.15 per cent. with an average of 9.35 per cent. and the fiber varied from 8.73 per cent. to 9.75 per cent. with an average of 9.09 per cent. The average retail price for this product was \$1.90 a hundred pounds.

CORN OIL MEAL

Analysis on Pages 94 and 95

Only one sample was secured representing the product sold as the feeding stuffs obtained by grinding the cake of the meats of the corn after the extraction of oil. The shipment represented by the sample was properly guaranteed and analyzed as follows: Protein 20.56 per cent., fat 8.92 per cent. and fiber 6.11 per cent. The retail price charged for this meal was \$1.75 per hundred pounds.

DISTILLERY AND BREWERY BY-PRODUCTS

DISTILLERS' DRIED GRAINS LARGELY FROM CORN

Analyses on Pages 94 to 97

There were 15 samples of this class of dried grains received and analyzed, all of which were found to be guaranteed and labeled. Two were found to be deficient in fat alone. This class of feed varies considerably in its composition owing to a considerable difference in the method of manufacture as varying proportions of grains are used in the mash. They were classified as "Distillers' Dried Grains largely from Corn" for the reason that corn makes up the greater proportion of the mash. In many cases the guarantees were considerably exceeded. The protein varied from 29.81 per cent. to 34.06 per cent. with an average of 31.43 per cent; the fat varied from 10.23 per cent. to 13.98 per cent. with an average of 11.67 per cent. and the fiber varied from 7.17 per cent. to 12.58 per cent. with an average of 10.60 per cent.

DISTILLERS' DRIED GRAINS LARGELY FROM RYE

Analysis on Pages 96 and 97

Only one sample of dried grains representing the residue from the process of distillation where rye is the predominating grain used, was secured. Guarantees were given and the results showed the protein to be 20.31 per cent., fat 5.56 per cent., which was less than the guarantee and the fiber 10.04 per cent.

DISTILLERY AND YEAST DRIED GRAINS

Analyses on Pages 96 and 97

During the year 6 samples of dried grains were received which were of different character than corn and rye distillers dried grains. This class of feeding stuffs is the dried grains which are a residue from the manufacture of yeast and vinegar and also a mixture of these dried grains with those secured from the manufacture of distilled spirits. Previous to recent investigation as to the source and character of these dried grains, they were, in many cases, being sold for or as distillers dried grains. This situation was largely due to a misunderstanding as to how they should be labeled, however, at the present time the dried grains, which are from the manufacture of yeast and also from the manufacture of vinegar, as subsequently vinegar is produced by continuing the process after the grains have

been removed from the drying machines, are now being labeled as "Yeast Dried Grains" or "Yeast and Vinegar Dried Grains" as the case may be. Where this product is mixed with distillers grains, the statement of composition gives this information. The samples included in this report contain the residue or what is left from the process of distillation of corn, oats, rye, barley malt and malt sprouts. One sample, No. 1044, was placed in this class for the reason that it did not have the same composition as distillers dried grains from corn and rye. In the case of the other 5 samples the protein varied from 18.63 per cent. to 21.00 per cent.; the fat varied from 6.86 per cent. to 8.12 per cent. and the fiber varied from 16.32 per cent. to 17.46 per cent. The retail price quoted varied from \$26.00 to \$36.40 a ton.

BREWERS DRIED GRAINS

Analyses on Pages 98 to 101

The number of samples of brewers dried grains received and analyzed during the year was 30 representing 17 brands, all of which were guaranteed. One sample was deficient in both protein and fat and 2 in protein alone. The protein varied from 19.00 per cent. to 31.94 per cent. with an average of 27.55 per cent.; the fat varied from 4.74 per cent. to 8.28 per cent, with an average of 6.98 per cent. and the fiber varied from 8.02 per cent. to 16.50 per cent. with an average of 13.49 per cent. It will be noted that in this class of feeding stuffs there is considerable variation in the chemical composition. This is due, as also in the case of distillers grains, to the fact that varying proportions of cereals are used in the mash in the process of brewing. In many cases the protein contents considerably exceeded the guarantees. It will also be noted that while there was a considerable variation in the percentage of nutrients contained in brewers dried grains, as represented by the samples analyzed, there was not a great variation in the retail price charged in a number of the brands which had about the same composition. The price charged varied from \$26.00 to \$35.00 per ton.

MALT SPROUTS

Analyses on Pages 100 and 101

There were only two samples of malt sprouts included in this report, both representing guaranteed shipments. They analyzed practically the same in protein and fat but the fiber varied from 9.63 per cent. to 13.85 per cent. The average analysis was as follows: Protein 28.53 per cent., fat 1.29 per cent. and fiber 11.74 per cent.

MAIZE BY-PRODUCTS.

CORN GLUTEN FEED

Analyses on Pages 100 to 103

This class of feeding stuffs was represented by eight different brands, 37 samples being received, one of which was found to be not guaranteed as required. No deficiencies, however, were observed. While the minimum guarantees for protein, with four exceptions, were 23.00 per cent., it will be noted that the contents of protein found upon analysis considerably exceeded this amount. There is considerable variation in the nutrients present in Corn Gluten Feed due, in a large measure, to the methods of manufacture and also to the proportion of the horny endosperm of the corn, which is usually present in gluten feeds. Where this portion of the corn is present in small proportions the protein frequently is lower than would otherwise be the case.

Two of the samples represent shipments, which were colored with an aniline dye. The protein varied from 23.63 per cent. to 29.81 per cent. with an average of 26.65 per cent.; the fat varied from 2.02 per cent. to 6.00 per cent. with an average of 3.18 per cent. and the fiber varied from 2.30 per cent. to 11.50 per cent., with an average of 6.73 per cent.

CORN GLUTEN MEAL

Analyses on pages 102 and 103

Two samples representing one brand of corn gluten meal, which is being offered to the trade, was analyzed during the year, which have the following average results: Protein 45.35 per cent., fat 1.20 per cent., and fiber 1.64 per cent. This meal is one of the higher concentrates containing as much protein as cottonseed meal although much less fat and fiber. It is made from the manufacture of starch. Both samples were guaranteed and properly labeled and no deficiencies were observed.

HOMINY FEED

Analyses on Pages 102 to 107

The number of brands of hominy feed found being offered for sale was 13, which are represented by 31 samples all but one of which were guaranteed as required. There were no deficiencies observed. The greatest variation noted in the composition was in the case of fat and fiber as the content of protein remains fairly constant for this class of feeds. The content of protein in every case considerably exceeded the guarantee given. There was also very little variation

in the general character of the samples examined. The protein varied from 10.81 per cent. to 12.50 per cent. with an average of 11.74 per cent.; the fat varied from 7.03 per cent. to 10.23 per cent., with an average of 8.49 per cent., and the fiber varied from 1.95 per cent. to 5.98 per cent., with an average of 4.55 per cent.

CORN BRAN

Analyses on Pages 106 and 107

There were only three samples of corn bran secured representing as many brands. The shipments from which these samples were taken were found to be guaranteed. One of the samples was found to contain a small amount of corn siftings. The protein varied from 9.56 per cent. to 10.56 per cent., with an average of 10.08 per cent.; the fat varied from 4.40 per cent. to 8.19 per cent., with an average of 6.35 per cent., and the fiber varied from 5.78 per cent. to 9.35 per cent., with an average of 7.75 per cent.

CORN FEED MEAL

Analysis on Pages 106 and 107

Only one sample was taken during the year representing the siftings obtained in the manufacture of cracked corn and table meal from the whole grain. This sample was of the average grade and was guaranteed and analyzed as follows: Protein 9.50 per cent.; fat 4.25 per cent., and fiber 1.85 per cent.

WHEAT OFFALS

LOW GRADE FLOUR

Analyses on Pages 106 and 107

The number of samples of wheat offals classed as "Low Grade Flour" or "Reddog" was only two, one of which was guaranteed. The average analysis of these samples gave the following results: Protein 16.75 per cent., fat 4.49 per cent., and fiber 2.72 per cent.

WHEAT MIDLINGS

Analyses on Pages 106 to 109

The number of samples of wheat middlings secured was 26, 6 of which were not guaranteed there being no deficiencies observed. Where wheat middlings are pure and do not contain ground screenings, the failure to have sacks or attached cards printed with the guaranteed analysis does not constitute a violation of the law. It

is desirable, however, that the guaranteed analysis should be given as this information indicates, to a large extent, the character of the product. In many cases, as will be noted, the protein content considerably exceeded the guarantees and there was considerable variation in analysis as the following results will show. The protein ranged from 14.50 per cent. to 20.25 per cent, with an average of 17.24 per cent.; the fat ranged from 4.05 per cent. to 6.56 per cent., with an average of 4.98 per cent., and the fiber ranged from 3.22 per cent. to 7.60 per cent., with an average of 5.15 per cent. Seven samples were found to contain traces of small amounts of ground grain screenings and should have been so labeled.

WHEAT MIDLINGS WITH ADMIXTURES

Analyses on Pages 108 to 113

A large proportion of the brands of wheat middlings, which were offered for sale, were those, which were labeled to contain the so-called "mill-run of ground screenings" and, therefore, the samples received and representing this class of products are classed as "Wheat Middlings with Admixtures." The number of samples received during the year was 44, all of which were guaranteed, as required. There were two samples which showed a deficiency in fat. In addition to the wheat middlings containing ground screenings in various amounts, there were 15 samples of middlings mixed with the following ingredients: reddog flour, hominy feed, palm oil and corn meal or middlings. The samples of wheat middlings and palm oil are sometimes sold as "Refuse Middlings" or "Refuse Cleaning Middlings" and are obtained as a by-product from the manufacture of the tin-plate. In the process of cleaning tin-plate, palm oil is used and the oil is absorbed from the bran by wheat middlings. Where the product is entirely free from slivers and small pieces of tin, it can be fed with safety and is a product possessing considerable feeding value, having a higher content of ether extract due to the addition of palm oil than is present in straight wheat middlings.

MIXED FEED: WHEAT BY-PRODUCT

Analyses on Pages 114 and 115

There were 10 samples of wheat mixed feed received and analyzed, 8 of which were guaranteed, there being no deficiencies. These samples were mixtures of wheat bran, wheat middlings and ground grain screenings. The protein varied from 15.38 per cent. to 18.88 per cent., with an average of 16.76 per cent.; the fat varied from 4.38 per cent. to 5.79 per cent., with an average of 5.02 per cent., and the fiber varied from 4.25 per cent. to 9.74 per cent., with an average of 7.53 per cent.

WHEAT BRAN

Analyses on Pages 114 to 117

The number of samples of wheat bran received and analyzed was 27, 15 of which were found to be labeled with the guaranteed analysis. There were no deficiencies observed and in many cases where the guarantees were given they were considerably exceeded. It will be noted by referring to the large table, that about one-half of these samples were found to contain varying amounts of ground grain screenings and should have been labeled "Wheat Bran and Screenings," however, as they were sold for pure wheat bran they are included in this class. Where this product contains the so-called "mill run of ground grain screenings," they should be labeled to indicate their true character and also with the guarantees for protein, fat and fiber. Purchasers of this product should carefully note the manner in which they are labeled if they desire to secure pure wheat bran, as otherwise, they are liable to obtain wheat bran which contain large amounts of screenings. The Department will be glad to co-operate with purchasers by an examination of samples to determine whether or not the shipment they have purchased, or are about to purchase contains ground grain screenings.

Inasmuch as there was quite a similarity in the general character of the samples of wheat bran analyzed an average was made of the results secured. The protein varied from 14.25 per cent. to 18.19 per cent., with an average of 16.00 per cent.; the fat varied from 4.27 per cent. to 5.80 per cent. with an average of 4.96 per cent., and the fiber varied from 7.95 per cent. to 10.73 per cent., with an average of 9.53 per cent.

WHEAT BRAN WITH ADMIXTURES.

Analyses on Pages 116 to 123

There were 49 samples of feeds classed as "Wheat Bran with Admixtures" received and analyzed during the year all but one of which were guaranteed. All but two of these samples were wheat brans with varying amounts of ground grain screenings. One of the samples was found to be deficient in protein. The two samples referred to were a mixture of wheat bran, corn flour and ground grain screenings. The results of analysis were as follows: The protein varied from 13.25 per cent. to 18.31 per cent., with an average of 16.34 per cent.; the fat varied from 3.77 per cent. to 5.69 per cent., with an average of 4.87 per cent. and the fiber varied from 7.69 per cent. to 12.31 per cent., with an average of 9.61 per cent.

MIXED FEED: RYE BY-PRODUCT

Analysis on Pages 122 and 123

Only one sample of this class of by-product feeds was received, a mixture of rye bran and rye middlings, and the results of analysis gave the following figures: Protein 17.00 per cent.; fat 3.77 per cent., and fiber 7.00 per cent., the shipment represented by the sample, was guaranteed 17.40 per cent., a little in excess of that found and the fiber was guaranteed 5.97 per cent., which was less than the amount found.

WHEAT AND RYE OFFALS

Analysis on Pages 122 and 123

One sample was received during the year, which was a mixture of wheat and rye middlings. The shipment represented by the sample was labeled and guaranteed and the results of analysis were as follows: Protein 16.06 per cent.; fat 4.25 per cent., which was less than the guarantee of 5.00 per cent., and the fiber 4.14 per cent.

OAT BY-PRODUCTS

Analyses on Pages 122 and 123

This class of by-products feeds was represented by five samples, four being oat feeds consisting for the most part of oat hulls and one being a sample of "Reground Oat Hulls." In the case of the oat feeds the protein ranged from 5.81 per cent. to 8.25 per cent.; the fat varied from 2.06 per cent. to 3.57 per cent., and the fiber ranged from 21.64 per cent. to 29.70 per cent. The sample of oat hulls ran under the guarantees for protein and fat and analyzed as follows: Protein 3.56 per cent., fat 1.13 per cent., and fiber 28.89 per cent.

BUCKWHEAT OFFALS

Analyses on Pages 124 and 125

The number of samples of feeds analyzed and classified as "Buckwheat Offals," was only four and consisted of two samples of middlings and two samples of feed. Both of these products varied considerably in their composition as follows: In the case of the middlings the protein ranged from 18.31 per cent. to 32.31 per cent., with an average of 25.31 per cent.; the fat ranged from 4.80 per cent. to 8.37 per cent., with an average of 6.59 per cent., and the fiber ranged from 3.18 per cent. to 4.98 per cent., with an average of 4.08 per cent. In the case of the feeds, the protein ranged from 10.78 per cent. to 15.44 per cent., with an average of 13.11 per cent.; the fat ranged from 2.88 per cent. to 4.00 per cent., with an average of 3.44 per cent., and the fiber ranged from 23.75 per cent. to 34.70 per cent., with an average of 29.22 per cent. One of the samples of feed was not guaranteed, as required.

ALFALFA MEAL

Analyses on Pages 124 and 125

The alfalfa meal being sold in the State was represented by ten samples and nine brands, all of which were found to be properly labeled and guaranteed, no deficiencies being observed. The results of analysis were as follows: The protein ranged from 13.19 per cent. to 15.88 per cent., with an average of 14.74 per cent.; the fat ranged from 1.41 per cent. to 3.13 per cent., with an average of 1.85 per cent., and the fiber ranged from 27.79 per cent. to 33.02 per cent., with an average of 30.13 per cent.

DRIED BEET PULP

Analyses on Pages 124 to 127

The number of samples of beet pulp received was 13, which represented only one brand produced by the Larrowe Milling Co. The samples were all guaranteed 8.00 per cent. protein, 0.50 per cent. fat and 20.00 per cent. fiber, which were all maintained. The protein varied from 8.38 per cent. to 10.44 per cent. with an average of 9.09 per cent.; the fat varied from 0.74 per cent. to 1.62 per cent., with an average of 1.10 per cent., and the fiber varied from 17.92 per cent. to 19.88 per cent., with an average of 18.88 per cent.

MIXED FEEDS—PROPRIETARY AND MISCELLANEOUS.

The samples of feeding stuffs secured during the year and classified under the general heading of "Mixed Feeds," numbered 778. A large proportion of these feeds represented the so-called "Proprietary" feeds or those having distinctive brand names. All but 46 of the samples represented shipments which were guaranteed and labeled as required. All but a few shipments, not guaranteed, were chop feeds and whole grain mixtures, not required to be labeled and guaranteed. The total number of kinds or brands represented was 426 and showed a considerable variation in their general character and chemical composition. Of the total number of these mixed feeds, 19.40 per cent. were found to contain varying amounts of whole weed seeds, which clearly indicates that there is room for improve-

ment in this respect. Over one-third of the total number, or 32.52 per cent., upon microscopical examination, were found to vary from the certified composition. This condition also shows that there is much more care needed in labeling and stating the list of ingredients. A large proportion of the mixed feeds were poultry foods and many of these, as will be noted, were not properly guaranteed for ingredients. The so-called "Molasses Feeds" made up one-third of the number of this class of feeds. The various classes of mixed feeds have been arranged in the large table according to their similarity and general characteristics, in order to readily compare the various brands found being sold in the State and they will also be referred to in the following remarks in the same order or classes. The number of samples together with these classes of feeds are as follows: Proprietary Dairy Feeds 80; Proprietary Dairy Feeds with Molasses 127; Proprietary Stock, Horse and Mule Feeds 94; Proprietary Stock, Horse and Mule Feeds with Molasses 134; Proprietary Calf Meals 13; Proprietary Swine Feeds 10; Proprietary Chop Feeds 49; Miscellaneous Chop Feeds 35; Miscellaneous Feeds 2, and Proprietary Poultry Foods 234.

PROPRIETARY DAIRY FEEDS

Analyses on Pages 126 to 145

There were 80 samples of feeding stuffs received and analyzed during the year, which were classified as "Proprietary Dairy Feeds." This number represented 25 brands and showed quite a variation in their chemical composition, as they varied in their content of protein from 13.06 per cent., in a cottonseed feed, to 29.13 per cent. The amount for which they were sold at retail ranged from \$23.00 to \$40.00 a ton. This class of feeds are those which are, for the most part, rather high in protein and are of the more concentrated type. The general character of these samples was good, there being only one in which a small amount of whole weed seeds were found present. Ten of the samples showed slight variations from their claimed composition. All of the shipments represented were found to be guaranteed and there were two samples deficient in both protein and fat and two deficient in protein alone. As a rule, however, the guarantees were more than met and in many cases, considerably exceeded, as will be noted. The ingredients of these feeds consisted, for the most part, of standard by-products such as cottonseed meal, linseed meal, corn gluten feed, distillers and brewers dried grains, malt sprouts and wheat and rye offals. The majority of these feeds were guaranteed 19.00 per cent. or more protein.

PROPRIETARY DAIRY FEEDS WITH MOLASSES

Analyses on Pages 144 to 173

The number of samples of mixed feeds classified as "Proprietary Dairy Feeds with Molasses," received and examined during the year, was 127, all but one of which were guaranteed, as required. The number of deficiencies in this class was greater than in any other class, there being two deficient in both protein and fat, 14 deficient in protein alone and 3 in fat alone. There was a wide variation in the character and chemical analysis of these feeds, as will be noted by referring to the tabulated results in the large table. The protein ranged from 11.18 per cent. in a mixture of alfalfa meal and molasses to 28.56 per cent. and the retail price quoted was from \$24.00 to \$36.00 a ton. Forty different brands were represented. In nine samples, there were found traces of small whole weed seeds and in 24 samples, small amounts of whole weed seeds were detected. There were no samples, which contained large amounts of whole weed seeds to the extent of 5.00 per cent., as was the case during the previous year. Of the total number of samples of these feeds, 41 were found to be not as certified, the ingredients identified by microscopical examination, as compared with those claimed, varied slightly, including those samples in which weed seeds were found present. There was also quite a variation in the content of moisture, the lowest containing 5.97 per cent. and the highest 15.91 per cent., while an average of the moisture content, of all the samples, would run approximately 12.00 per cent. These feeds, for the most part, were mixtures of ground grain screenings, or screenings meal, together with whole grains and concentrated by-products, such as cottonseed meal, linseed meal, distillers and brewers dried grains and molasses. There were a few samples, containing oat hulls, as an ingredient, in which the content of fiber was found to exceed the amount permitted.

From this data, it will be observed that there is considerable room for improvement in the manner of correctly stating the guarantees and lists of ingredients and removing whole weed seeds. This condition, however, has improved somewhat over that observed during the work of previous years and it is hoped that this improvement will be continued. While there were quite a number of deficiencies noted there were many samples, which upon analysis, considerably exceeded the guarantees.

PROPRIETARY STOCK, HORSE AND MULE FEEDS

Analyses on Pages 172 to 193

This group of feeds include those less concentrated or containing, as a rule, less protein than the dairy feeds in the two preceding groups and also showed considerable variation in their composition,

the protein ranging from 8.50 per cent. to 21.38 per cent. There were 94 samples received, all of which were guaranteed representing 43 different brands. The retail price quoted was from \$28.00 to \$40.00 a ton. There were three deficiencies in protein and one in fat and two samples were found to contain traces of small whole weed seeds and one a small amount of these foreign seeds. Of the total number examined microscopically, 18 were found to vary from the certified composition. There were 24 samples, including oat hulls, as an ingredient, where the content of fiber exceeded 9.00 per cent. These brands of feeds were mixtures, for the most part, of whole and cracked grains with by-product feeds, such as cottonseed meal, linseed meal, maize by-products, wheat and rye offals and a few samples contained alfalfa meal. The general character of these feeds was good although there is room for improvement with respect to correctly stating the list of ingredients.

PROPRIETARY STOCK, HORSE AND MULE FEEDS WITH MOLASSES
Analyses on Pages 192 to 200

The number of samples of "Stock, Horse and Mule Feeds with Molasses" received and analyzed during the year was 134, representing 66 different brands, all but three of these being guaranteed. These feeds, on an average contained from 10.00 per cent. to 12.00 per cent. of protein although there was a considerable variation from the lowest to the highest protein content, which ranged from 3.91 per cent. in a mixture of sphagnum moss and molasses, to 20.44 per cent. The retail price quoted also varied considerably, being from \$21.00 to \$48.00 a ton. This class of feeds were composed, for the most part, of whole and cracked grains with by-product feeds including distillers and brewers dried grains, cottonseed meal, linseed meal, wheat, rye, oat offals and molasses. A large proportion of them contained alfalfa meal as an ingredient and several were mixtures of whole grains, alfalfa meal and molasses. The general character of this class of feeds was good, as they were clean in their general appearance and free from the presence of whole weed seeds, only one sample being found to contain a small amount of foreign seeds. There were 13 samples, in which the ingredients identified, did not quite agree with those claimed. There were two brands of feeds represented containing a very low content of protein being more in the nature of roughage, which were mixtures of rice straw and molasses and sphagnum moss and molasses, which sold at retail prices of \$25.00 to \$35.00 a ton respectively. There were 12 samples containing oat hulls as an ingredient, in which the content of fiber exceeded 9.00 per cent. Many of the samples contained considerable quantities of moisture, averaging higher than any other class of feeds, ranging from 7.98 per cent. to 22.89 per cent.

PROPRIETARY CALF MEALS

Analyses on Pages 208 to 211

The number of samples of "Proprietary Calf Meals" received and analyzed, was 13, all of which were guaranteed, there being only one sample deficient in protein. These products are of the more concentrated type ranging in protein from 17.19 per cent. to 27.38 per cent. and the retail price charged was also high, being from \$60.00 to \$80.00 a ton. There were 6 brands represented and the results of microscopical examination showed the ingredients listed to be as claimed. The general appearance of this class of goods, as represented by the samples examined, was clean and free from foreign materials.

PROPRIETARY SWINE FEEDS

Analyses on Pages 210 to 213

This group of mixed feeds contain those samples representing brands which were especially sold for feeding swine and are of the more concentrated type, ranging in their protein content from 11.86 per cent. to 23.94 per cent. There were 10 samples examined, representing 8 brands, all of which were guaranteed. Three samples were deficient in fat. The price quoted ranged from \$31.00 to \$70.00 a ton. In three samples the list of ingredients were found to vary slightly from those claimed and the guarantees as a rule, were considerably exceeded. These feeds contained a variety of products including cottonseed meal, linseed meal, distillers and brewers dried grains, ground grain screenings, cereal or grain meals, tankage, cocoa shell meal, flaxseed, charcoal and salt.

PROPRIETARY CHOP FEEDS

Analyses on Pages 212 to 221

The number of samples of feeding stuffs received and analyzed during the year and classified as "Proprietary Chop Feeds" was 49, all but one of which were guaranteed. Twenty-eight different brands were represented. These feeds were composed largely of whole and cracked grains and corn, oat, wheat, rye, maize offals, etc., and, as a rule, showed little variation in their chemical analysis. The protein ranged from 7.38 per cent. to 13.38 per cent. and the retail price quoted was from \$30.00 to \$40.00 a ton. There were 13 samples, in which the list of ingredients was found to be somewhat different from that claimed on sacks or attached cards.

MISCELLANEOUS CHOP FEEDS

Analyses on Pages 220 to 223

In this class of feeding stuffs are included the 35 samples received which represented as many different kinds or classes of feeds offered for sale in the State and which, as a rule, were composed of ground or whole grains. There were 15 samples guaranteed, one of which was found to be deficient in fat. In five samples, where the composition was given, the results of examination showed them to be somewhat different from the list of ingredients claimed. The following samples of chop feeds together with the number and their average analysis were received: Corn Chops, 3, protein 8.92 per cent.; fat 3.70 per cent., and fiber 2.94 per cent. Barley Chop, 1, protein 13.25 per cent., fat 4.24 per cent., and fiber 11.91 per cent. Corn and Oats Chop, 14, protein 10.58 per cent., fat 4.64 per cent., and fiber 4.57 per cent. Corn, Oats and Barley Chops, 4, having an average of 10.64 per cent. protein, 3.85 per cent. fat, and 3.40 per cent. fiber. There were 13 Miscellaneous Chop Feeds received, which were composed of various grains and by-products, as will be noted by referring to the large table.

MISCELLANEOUS FEEDS

Analyses on Pages 222 and 223

There were only two samples of feeding stuffs received and classified as "Miscellaneous Feeds," one being sold as "Corn Meal" and composed of Corn Siftings, which analyzed 10.00 per cent. protein, 4.53 per cent. fat, and 2.56 per cent. fiber, and one sample of "Wheat Screenings Meal," which analyzed as follows: Protein 17.13 per cent.; fat 7.89 per cent, and fiber 7.31 per cent.

PROPRIETARY POULTRY FOODS

Analyses on Pages 222 to 267

The various kinds and brands of poultry foods found being sold in Pennsylvania are represented by 234 samples, which make up one-third of the number of mixed feeds examined during the year. This number represented 173 different brands, which show quite a variation in their composition. It cannot be said of these feeds that they were, as a rule, correctly guaranteed for ingredients as in the case of the other classes of feeding stuffs. There were 214 samples representing shipments labeled with the guaranteed analysis and list of ingredients and of this number more than half, or 150 were, upon microscopical examination, found to be different in composition than that claimed, containing varying amounts of weed seeds.

Twenty samples were found to contain traces of small weed seeds, 74 small amounts of whole weed seeds and 19 samples contained large or excessive amounts of whole weed seeds, which are prohibited from being mixed in feeding stuffs, sold in the State. Where this number of samples, or 14.52 per cent. of the number examined, contained foreign seeds, there is decidedly room for improvement with respect to labeling and freeing these products from weed seeds. There was a considerable variation in the analysis of the poultry foods, the protein ranging from 9.13 per cent., in a whole grain mixture, to 30.25 per cent. in one of the brands of "Dry Mash" foods. There was also quite a variation in the retail prices charged for these products, the prices quoted ranging from \$36.00 to \$60.00 a ton and in one case as high as \$115.00 a ton, in a product which was a mixture of wheat flour and meat. There were two samples deficient in both protein and fat, 6 deficient in protein alone and 8 in fat alone. The products, which entered to a large extent, into the make-up of the poultry foods included whole grains and nearly every feed known to the feeding stuffs industry, as will be noted by referring to the list of ingredients, both certified and found as shown in the large table on the pages indicated.

ANIMAL BY-PRODUCTS

Analyses on Pages 266 to 269

There were 19 samples received during the year, which because of their character, were classified as "Animal By-Products," all but one of these samples being guaranteed, as required. Four were deficient in protein alone and two in fat alone. These by-products included meat scrap, meat and bone scrap, fish scrap and digester tankage. In a number of cases, as will be noted, bone was found present and the samples including bone should have been labeled "Beef and Bone Scrap." Because of the origin of these feeds they were high in their protein content, ranging from 35.68 per cent. to 80.63 per cent. The retail prices quoted showed a considerable variation ranging from \$48.00 to \$80.00 a ton.

CONDIMENTAL STOCK AND POULTRY FOODS

Analyses on Pages 268 to 271

Only five samples of this class of foods were received, two of which were not found to be labeled with the guaranteed analysis. Five brands were represented and, as will be noted in the list of ingredients shown in the large table, quite a variety of products was used

in their preparation. Two of the samples were sold as tonics, the others being sold as foods. The content of protein ranged from 9.38 per cent. to 16.66 per cent., and the retail price quoted, which does not appear excessive when sold in small amounts, reaches a high figure on the ton basis in some cases, as will be noted. The lowest price charged was \$24.00 and the highest on the ton basis was estimated to be \$320.00 a ton.

ANALYSES OF FEEDING STUFFS COLLECTED BY SPECIAL AGENTS

The results of analyses and microscopical examinations of the 1264 official samples of feeding stuffs secured during 1915 are shown in the following table (No. V). The information includes the chemist's and agent's numbers, the brand names or names of the various feeds, the names and addresses of the manufacturers or importers, the names and addresses of dealers from whom each sample was obtained, the guarantees for protein, fat and fiber, the list of ingredients which were found upon sacks or attached cards and the retail prices quoted at the time the samples were secured. The samples have been arranged in classes or groups, as outlined in table No. II, like brands being placed together for comparison. Where two or more samples of the same kind, brand or class of feeding stuffs were received an average of their analysis was estimated. In referring to this table, the information for the various feeds will be found in the order noted and under the following general headings and sub-headings:

OIL CAKE MEALS including cottonseed meal, new process and old process linseed meal, cocoanut oil meal and corn oil meal.

DISTILLERY AND BREWERY BY-PRODUCTS including distillers' dried grains largely from corn and rye, distillers' and yeast dried grains, brewers dried grains and malt sprouts.

MAIZE BY-PRODUCTS including corn gluten feed, corn gluten meal hominy feed, corn bran and corn feed meal.

WHEAT OFFALS including low grade flour, wheat middlings, wheat middlings with admixtures, mixed feed: wheat by-products, wheat bran and wheat bran with admixtures.

RYE OFFALS including rye mixed feed.

WHEAT AND RYE OFFALS including wheat and rye middlings.

OAT BY-PRODUCTS including oat feeds and oat hulls.

BUCKWHEAT OFFALS including buckwheat middlings and buckwheat feed.

ALFALFA MEAL.

DRIED BEET PULP.

MIXED FEEDS: PROPRIETARY AND MISCELLANEOUS, including proprietary dairy feeds, proprietary dairy feeds with molasses, proprietary stock, horse and mule feeds, proprietary stock, horse and mule feeds with molasses, proprietary calf meals, proprietary swine feeds, proprietary chop feeds, miscellaneous chop feeds, miscellaneous feeds and proprietary poultry foods.

ANIMAL BY-PRODUCTS.

CONDIMENTAL STOCK AND POULTRY FOODS.

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
OIL CAKE MEALS.						
Cottonseed Meal.						
				Per ct.	Per ct.	Per ct.
106	M. F. B. Prime, M. F. Bar- inger, Philadelphia, Pa.	Harrisburg, Paxton Flour & Feed Co.	106	8.08	37.68	38.62
1071	Bartlett's Michigan Farmer Brand, The J. E. Bartlett Co., Jackson, Mich.	Montrose, Brown & Fassett	1071	9.14	42.44	41-46
871	Bartlett's Michigan Farmer Brand, The J. E. Bartlett Co., Jackson, Mich.	New Castle, Fisher & Mengle.	871	8.33	40.38	41-46
483	Bartlett's Michigan Farmer Brand, The J. E. Bartlett Co., Jackson, Mich.	New Brighton, M. H. Stager.	483	7.45	43.69	41-46
		Average, .....	.....	8.30	42.17	.....
598	Jersey Brand, The J. E. Bart- lett Co., Jackson, Mich.	New Kensington, A. H. Klugh	598	8.48	39.38	38-42
538	Owl Brand High Grade, F. W. Brode & Co., Memphis, Tenn.	Quarryville, S. Book & Bro.	538	8.70	42.56	41.00
134	Owl Brand High Grade, F. W. Brode & Co., Memphis, Tenn.	South Fork, J. E. Crisman	134	8.96	44.19	41.00
523	Owl Brand High Grade, F. W. Brode & Co., Memphis, Tenn.	Danville, Danville Milling Co.	523	8.49	40.88	41.00
216	Owl Brand High Grade, F. W. Brode & Co., Memphis, Tenn.	Palmyra, Early & Det- weiler.	216	8.53	42.25	41.00
430	Owl Brand High Grade, F. W. Brode & Co., Memphis, Tenn.	Elkland, Elkland Roller Mills.	430	7.30	42.25	41.00
416	Owl Brand High Grade, F. W. Brode & Co., Memphis, Tenn.	Coudersport, Gates Bros.	416	7.00	48.66	41.00
764	Owl Brand High Grade, F. W. Brode & Co., Memphis, Tenn.	Titusville, Kerr Hill Mill Co., Ltd.	764	8.33	42.06	41.00
213	Owl Brand High Grade, F. W. Brode & Co., Memphis, Tenn.	Palmyra, J. H. Kettering & Son.	213	8.77	44.56	41.00
84	Owl Brand High Grade, F. W. Brode & Co., Memphis, Tenn.	Manheim, Lancaster Co. Farmers' Association.	84	7.10	44.63	41.00
549	Owl Brand High Grade, F. W. Brode & Co., Memphis, Tenn.	Ronks, E. D. Leaman,	549	8.07	43.75	41.00
53	Owl Brand High Grade, F. W. Brode & Co., Memphis, Tenn.	Elizabethtown, Lehman & Wolgenmuth.	53	8.50	42.75	41.00
33	Owl Brand High Grade, F. W. Brode & Co., Memphis, Tenn.	Littlestown, Littlestown Milling Co.	33	8.05	41.88	41.00
236	Owl Brand High Grade, F. W. Brode & Co., Memphis, Tenn.	Cleona, John H. Long,	236	9.00	41.56	41.00
922	Owl Brand High Grade, F. W. Brode & Co., Memphis, Tenn.	Canton, Preston Bros., ..	922	7.94	47.91	41.00
351	Owl Brand High Grade, F. W. Brode & Co., Memphis, Tenn.	Phillipsburg, J. O. Reed, ..	351	9.00	42.13	41.00
498	Owl Brand High Grade, F. W. Brode & Co., Memphis, Tenn.	Rochester, Rochester Seed & Supply Co.	498	7.95	41.19	41.00
927	Owl Brand High Grade, F. W. Brode & Co., Memphis, Tenn.	Canton, J. Rockwell & Son.	927	8.97	41.81	41.00
222	Owl Brand High Grade, F. W. Brode & Co., Memphis, Tenn.	Avon, Charles Z. Weiss, ..	222	9.33	41.81	41.00
		Average, .....	.....	8.38	43.19	.....

FEEDING STUFFS COLLECTED IN 1915.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct.	Per ct.	Per ct.	Per ct.	Per ct.			
8.58	6.00	11.97	12.00	\$32.00	Made from cottonseed.	Cottonseed meal and excessive amount of hulls.	103
8.40	7-12	8.34	6-10	1.70	.....	Cottonseed meal,	1071
7.08	7-12	9.96	6-10	1.75	.....	Cottonseed meal,	871
9.74	7-12	6.92	6-10	1.70	.....	Cottonseed meal,	483
8.41	.....	8.40	.....	24.33			
7.14	7-12	11.99	6-13	2.00	.....	Cottonseed meal and excessive amount of hulls.	593
7.88	6.00	9.90	10.00	32.00	Made from cottonseed.	As certified,	538
8.10	6.00	7.07	10.00	33.00	Decorticated cottonseed,	As certified,	124
8.46	6.00	10.08	10.00	1.85	Decorticated cottonseed,	As certified,	523
7.45	6.00	9.33	10.00	1.75	Made from cottonseed,	As certified,	216
7.78	6.00	9.68	10.00	1.65	Made from cottonseed,	As certified,	430
7.26	6.00	7.55	10.00	1.70	Decorticated cottonseed,	As certified,	416
7.21	6.00	9.81	10.00	1.75	Made from cottonseed,	As certified,	764
8.48	6.00	6.16	10.00	33.00	Made from cottonseed,	As certified,	213
8.88	6.00	7.77	10.00	30.00	Decorticated cottonseed,	As certified,	84
7.33	6.00	8.72	10.00	23.50	Made from cottonseed,	As certified,	549
8.08	6.00	7.09	10.00	32.00	Made from cottonseed,	As certified,	53
7.68	6.00	9.07	10.00	22.50	Decorticated cottonseed,	As certified,	32
7.29	6.00	9.51	10.00	1.60	Made from cottonseed,	As certified,	236
8.21	6.00	6.39	10.00	1.70	Made from cottonseed,	As certified,	922
7.33	6.00	8.77	10.00	1.80	Made from cottonseed,	As certified,	351
7.52	6.00	10.07	10.00	1.75	Decorticated cottonseed,	As certified,	498
7.57	6.00	9.28	10.00	1.75	Made from cottonseed,	As certified,	927
7.67	6.00	9.47	10.00	1.80	Decorticated cottonseed,	As certified,	222
7.32	.....	8.65	.....	23.56			

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
780	Buckeye Prime, The Buckeye Cotton Oil Co., Cincinnati, Ohio.	Spartansburg, Brooklyn Milling Co.	780	Per ct. 7.26	Per ct. 44.18	Per ct. 41.00
863	Buckeye Prime, The Buckeye Cotton Oil Co., Cincinnati, Ohio.	New Castle, City Roller Mills.	863	7.67	41.19	38.62
762	Buckeye Prime, The Buckeye Cotton Oil Co., Cincinnati, Ohio.	Altoona, E. D. Clark,	762	8.16	40.94	38.62
781	Buckeye Prime, The Buckeye Cotton Oil Co., Cincinnati, Ohio.	Spartansburg, Davis & Hyde.	781	7.42	40.19	38.62
1089	Buckeye Prime, The Buckeye Cotton Oil Co., Cincinnati, Ohio.	Hazleton, George W. Engle	1089	8.70	36.06	38.62
448	Buckeye Prime, The Buckeye Cotton Oil Co., Cincinnati, Ohio.	Mansfield, Equity Co-Operative Exchange.	448	6.08	42.94	41.00
872	Buckeye Prime, The Buckeye Cotton Oil Co., Cincinnati, Ohio.	New Castle, Fisher & Mengle.	872	8.24	39.00	38.62
489	Buckeye Prime, The Buckeye Cotton Oil Co., Cincinnati, Ohio.	New Brighton, J. H. Hornby & Son.	489	6.65	40.13	38.62
1015	Buckeye Prime, The Buckeye Cotton Oil Co., Cincinnati, Ohio.	Wilkes-Barre, C. P. Matthews & Sons, Inc.	1015	9.00	38.50	38.62
1022	Buckeye Prime, The Buckeye Cotton Oil Co., Cincinnati, Ohio.	Wilkes-Barre, Miner-Hillard Milling Co.	1022	8.50	39.19	38.62
		Average,		7.73	40.23	.....
162	Good Luck Brand, S. P. Davis, Little Rock, Ark.	Somerset, H. C. Beerits' Sons.	162	8.55	45.19	41.00
913	Good Luck Brand, S. P. Davis, Little Rock, Ark.	Harmony, Harmony Cereal Mills.	913	9.21	41.44	41.00
556	Good Luck Brand, S. P. Davis, Little Rock, Ark.	Leaman Place, Harry K. Hershey.	556	8.44	40.63	41.00
1223	Good Luck Brand, S. P. Davis, Little Rock, Ark.	Linesville, Linesville Coal Lime & Cement Co.	1223	9.97	41.75	41.00
898	Good Luck Brand, S. P. Davis, Little Rock, Ark.	Mars, Mars Milling & Feed Co.	898	9.11	41.00	41.00
99	Good Luck Brand, S. P. Davis, Little Rock, Ark.	Harrisburg, Paxton Flour & Feed Co.	99	5.63	40.69	41.00
1096	Good Luck Brand, S. P. Davis, Little Rock, Ark.	Sharon, J. M. Porter,	1096	8.52	41.75	41.00
118	Good Luck Brand, S. P. Davis, Little Rock, Ark.	Johnstown, Swope Bros.,	118	6.83	45.19	41.00
174	Good Luck Brand, S. P. Davis, Little Rock, Ark.	Windber, Weaver & Berkeley.	174	9.32	41.69	41.00
		Average,		8.39	43.18	.....
996	Queen, The Dewey Brothers Co., Blanchester, Ohio.	Washington, Washington Milling Co.	996	8.26	40.06	41.00
611	..... East St. Louis Cotton Oil Co., National Stock Yards, Ill.	Oil City, Enterprise Milling Co.	611	7.11	45.50	41.5-46
835	High Grade, Farmers' Cotton Oil & Trading Co., Uniontown, Ala.	Milton, C. H. McMahan, .	835	8.75	41.19	41.00
1258	Equality Brand, The Feeders Supply Co., Kansas City, Mo.	Hays, John Lachman & Co.	1258	8.75	39.50	38.62
82	Equity Brand, The Feeders Supply Co., Kansas City, Mo.	Manheim, Lancaster Co. Farmers' Ass'n.	82	7.67	40.38	41.00
409	Orlolo Brand Choice, H. J. Haslehurst, Baltimore, Md.	Coudersport, Eulalia Mills,	409	8.63	38.13	41.00
644	Orlolo Brand Choice, H. J. Haslehurst, Baltimore, Md.	St. Marys, Jacob-Keller Co.	644	8.15	40.94	41.00
		Average,		8.39	39.54	.....

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 8.02	Per ct. 6.50	Per ct. 5.01	Per ct. 10.00	Per ct. 29.00		Cottonseed meal,	780
6.81	6.00	10.70	12.00	33.00		Cottonseed meal,	863
6.52	6.00	11.12	12.00	34.00		Cottonseed meal,	762
7.61	6.00	11.04	12.00	33.00		Cottonseed meal,	761
6.21	6.00	12.34	12.00	1.75		Cottonseed meal and excessive amount of hulls.	1069
7.82	6.00	9.79	10.00	1.70		Cottonseed meal,	448
6.28	6.00	12.12	12.00	1.65		Cottonseed meal and excessive amount of hulls.	872
7.33	6.00	11.29	12.00	1.70		Cottonseed meal and excessive amount of hulls.	489
6.97	6.00	10.97	12.00	33.00		Cottonseed meal,	1015
6.81	6.00	10.91	12.00	1.65		Cottonseed meal,	1022
7.04	.....	10.70	.....	34.10			
8.50	7.00	6.57	9.00	21.00	Decorticated cottonseed,	As certified,	162
6.91	7.00	8.39	9.00	1.90	Decorticated cottonseed,	As certified,	918
6.54	7.00	12.08	9.00	1.85	Decorticated cottonseed,	Cottonseed meal and excessive amount of hulls.	556
7.07	6.00	9.69	9.00	35.00	Decorticated cottonseed,	As certified,	1223
8.25	7.00	8.94	9.00	1.70	Decorticated cottonseed,	As certified,	898
7.26	7.00	11.74	9.00	32.00	Decorticated cottonseed,	As certified,	99
8.34	7.00	9.65	9.00	1.75	Decorticated cottonseed,	As certified,	1096
10.61	7.00	7.34	9.00	33.00	Decorticated cottonseed,	As certified,	113
8.75	7.00	8.19	9.00	24.00	Decorticated cottonseed,	As certified,	174
8.04	.....	9.17	.....	24.30			
7.99	7.00	10.76	10.00	1.60		Cottonseed meal,	996
7.28	6.5-8	9.02	8-10	1.90		Cottonseed meal,	611
8.64	9.00	8.60	7.00	.....	Decorticated cottonseed,	As certified,	835
8.23	5.50	9.95	12.00	1.95	Decorticated cottonseed,	As certified,	1258
8.99	6.00	10.28	10.00	30.00	Decorticated cottonseed,	As certified,	82
7.71	6.00	11.54	10.00	1.85		Cottonseed meal and excessive amount of hulls.	409
7.90	6.00	10.75	10.00	1.65		Cottonseed meal,	644
7.81	.....	11.14	.....	35.00			

TABLE V.—ANALYSES OF SAMPLES O.

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
514	Canary Brand Choice, D. H. Hickey & Co., Memphis, Tenn.	Sunbury, Blank & Gottshall.	514	Per ct. 7.17	Per ct. 37.25	Per ct. 41.00
147	Canary Brand Choice, D. H. Hickey & Co., Memphis, Tenn.	Somerset, Saylor & Woy.	147	7.83	40.53	41.00
		Average, .....	.....	7.50	39.08	.....
424	Dixie Brand, Humphreys-Godwin Co., Memphis, Tenn.	Westfield, Frank A. Ackley.	424	7.60	42.88	41.00
859	Dixie Brand, Humphreys-Godwin Co., Memphis, Tenn.	New Castle, J. S. Brown's Sons.	859	8.00	43.44	38.63-43
330	Dixie Brand, Humphreys-Godwin Co., Memphis, Tenn.	New Salem, Mike Duvaya.	330	8.97	40.69	38.63-43
729	Dixie Brand, Humphreys-Godwin Co., Memphis, Tenn.	Lock Haven, F. H. Dyer.	729	7.53	42.25	38.63-43
807	Dixie Brand, Humphreys-Godwin Co., Memphis, Tenn.	Reynoldsville, Fales Grocery Co.	807	7.28	50.88	38.63-43
584	Dixie Brand, Humphreys-Godwin Co., Memphis, Tenn.	Kittanning, William Gates Est.	584	7.45	42.44	38.63-43
576	Dixie Brand, Humphreys-Godwin Co., Memphis, Tenn.	Kittanning, J. A. Gault & Co.	576	8.10	40.81	38.63-43
141	Dixie Brand, Humphreys-Godwin Co., Memphis, Tenn.	Johnstown, Johnstown Milling Co.	141	8.60	39.63	38.63-43
797	Dixie Brand, Humphreys-Godwin Co., Memphis, Tenn.	Punxsutawney, Mahoning Valley Milling Co.	797	7.65	41.81	38.63-43
1110	Dixie Brand, Humphreys-Godwin Co., Memphis, Tenn.	Charleroi, R. C. Mountser.	1110	7.60	41.50	38.63-43
315	Dixie Brand, Humphreys-Godwin Co., Memphis, Tenn.	Scottdale, J. E. Pritts.	315	6.07	41.63	38.63-43
645	Dixie Brand, Humphreys-Godwin Co., Memphis, Tenn.	St. Marys, Leonard Ritter.	645	7.73	39.19	38.63-43
634	Dixie Brand, Humphreys-Godwin Co., Memphis, Tenn.	DuBois, Timlin, Kelly & Co.	634	6.92	45.75	38.63-43
		Average, .....	.....	7.65	42.53	.....
169	Imperial Cotto Brand Choice, Imperial Cotto Milling Co., Memphis, Tenn.	Windber, Claude Davis.	169	8.89	40.44	41-45
463	Imperial Cotto Brand Choice, Imperial Cotto Milling Co., Memphis, Tenn.	Wellaboro, R. J. Dunham.	463	7.47	43.09	41-45
338	Imperial Cotto Brand Choice, Imperial Cotto Milling Co., Memphis, Tenn.	Uniontown, J. F. Hogeatt & Son.	338	7.21	39.13	41-45
604	Imperial Cotto Brand Choice, Imperial Cotto Milling Co., Memphis, Tenn.	Franklin, Johnson & Co.	604	9.23	36.44	41-45
614	Imperial Cotto Brand Choice, Imperial Cotto Milling Co., Memphis, Tenn.	Tionesta, Lanson Bros.,	614	7.93	41.06	41-45
468	Imperial Cotto Brand Choice, Imperial Cotto Milling Co., Memphis, Tenn.	Monaca, Monaca Roller Mills.	468	8.14	43.44	41-45
323	Imperial Cotto Brand Choice, Imperial Cotto Milling Co., Memphis, Tenn.	Scottdale, F. V. Perry, ..	323	8.25	36.38	41-45
346	Imperial Cotto Brand Choice, Imperial Cotto Milling Co., Memphis, Tenn.	Connellsville, Perry & Henderson.	346	8.17	38.25	41-45
		Average, .....	.....	8.13	40.39	.....
747	Jersey Brand, Lanier Brothers, Nashville, Tenn.	Lock Haven, E. E. Wentz.	747	8.36	42.19	38.63
128	Staff Brand High Grade, The Larrowe Milling Co., Detroit, Mich.	Carrolltown, W. A. Eck-enrode.	128	8.22	47.68	41.00
121	Staff Brand High Grade, The Larrowe Milling Co., Detroit, Mich.	Patton, F. E. Farabaugh.	121	8.60	47.32	41.00
		Average, .....	.....	8.43	47.51	.....

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 10.77	Per ct. 6.00	Per ct. 11.21	Per ct. 10.00	Per ct. 25.00			
					Decorticated cottonseed.	Cottonseed meal and excessive amount of hulls.	514
7.74	6.00	9.80	10.00	1.85	Decorticated cottonseed.	As certified,	147
9.28	.....	10.50	.....	26.00			
7.43	6.00	9.34	10.00	1.65	Made from cottonseed. pressed	As certified,	424
7.54	6-8	8.50	8-12	1.65	Made from cottonseed. pressed	As certified,	859
8.54	6-8	9.85	8-12	1.85	Made from cottonseed. pressed	As certified,	330
9.55	6-8	8.50	8-12	1.70	Made from cottonseed. pressed	As certified,	729
7.21	6-8	6.50	8-12	1.80	Made from cottonseed. pressed	As certified,	807
7.97	6-8	9.89	8-12	1.65	Made from cottonseed. pressed	As certified,	531
7.01	6-8	9.34	8-12	1.65	Made from cottonseed. pressed	As certified,	576
6.85	6-8	11.00	8-12	2.00	Made from cottonseed. pressed	Cottonseed meal and excessive amount of hulls.	141
8.11	6-8	10.10	8-12	1.75	Made from cottonseed. pressed	As certified,	737
7.47	6-8	10.09	8-12	1.90	Made from cottonseed. pressed	As certified,	1110
6.23	6-8	11.05	8-12	1.70	Made from cottonseed. pressed	As certified,	315
7.19	6-8	10.91	8-12	1.75	Made from cottonseed. pressed	Cottonseed meal and excessive amount of hulls.	645
8.00	6-8	7.04	8-12	1.80	Made from cottonseed. pressed	As certified,	634
7.64	.....	9.43	.....	25.15			
8.00	8.00	10.16	9.00	34.00		Cottonseed meal,	169
8.13	8.00	9.03	9.00	1.75		Cottonseed meal,	463
9.40	8.00	10.12	9.00	30.00		Cottonseed meal,	338
6.05	8.00	13.24	9.00	2.00		Cottonseed meal and excessive amount of hulls.	604
7.43	8.00	10.98	9.00	1.75		Cottonseed meal and excessive amount of hulls.	614
7.99	8.00	8.25	9.00	1.70		Cottonseed meal,	468
6.09	8.00	14.18	9.00	1.70		Cottonseed meal and excessive amount of hulls.	323
5.95	8.00	13.63	9.00	.....		Cottonseed meal and excessive amount of hulls.	346
7.38	.....	11.19	.....	34.57			
7.01	6.00	9.64	10.00	1.65	Decorticated cottonseed.	As certified,	747
7.22	7.00	7.51	10.00	1.75	Decorticated cottonseed.	As certified,	128
7.21	7.00	7.50	10.00	1.75	Decorticated cottonseed.	As certified,	121
7.25	.....	7.50	.....	25.00			

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
613	..... L. B. Lovitt & Co., Memphis, Tenn.	Oil City, Clyde D. Duffee,	613	Per ct. 8.86	Per ct. 39.89	Per ct. 41.00
154	Tip Top Choice, Meridian Grain & Elevator Co., Meri- dian, Miss.	Somerset, John G. Emert,	154	7.64	46.69	48.02
294	Tip Top Choice, Meridian Grain & Elevator Co., Meri- dian, Miss.	McKeesport, Keystone Supply Co.	294	8.17	39.63	41.00
285	Tip Top Choice, Meridian Grain & Elevator Co., Meri- dian, Miss.	Greensburg, McFarland Supply Co.	285	8.80	42.44	43.02
	Average,			8.20	42.25	.....
1064	Canary Extra Brand Choice, C. L. Montgomery & Co., Memphis, Tenn.	Montrose, Andre & Sweet,	1064	9.56	42.63	41-43
756	Canary Extra Brand Choice, C. L. Montgomery & Co., Memphis, Tenn.	Bellefonte, Gamble Gheen & Co.	756	7.84	46.06	41-43
92	Canary Extra Brand Choice, C. L. Montgomery & Co., Memphis, Tenn.	Harrisburg, Hoffer & Gar- man.	92	8.75	39.09	41-43
421	Canary Extra Brand Choice, C. L. Montgomery & Co., Memphis, Tenn.	Westfield, H. Z. Pride & Son.	421	7.09	41.69	41-43
543	Canary Extra Brand Choice C. L. Montgomery & Co., Memphis, Tenn.	Bird-in-hand, J. A. Umble & Bro.	543	8.20	42.00	41-43
	Average,			8.29	42.29	.....
1006	Bee Brand, W. O. Northern, Little Rock, Ark.	Canonsburg, W. H. Dun- lap, Jr.	1006	8.64	40.69	41-43
606	Sun Brand Prime Finely Ground, Shepard, Clark & Co., Cleveland, Ohio.	Franklin, J. H. Lavery, .	606	7.42	40.06	41-45
1092	Sun Brand Prime Finely Ground, Shepard, Clark & Co., Cleveland, Ohio.	Farrell, J. B. Roux,	1092	8.77	41.60	41-45
	Average,			8.09	40.88	.....
6	Dirigo Brand, W. Newton Smith, Baltimore, Md.	York, Anderson Bros. & Co.	6	7.73	42.31	41-43
680	Dirigo Brand, W. Newton Smith, Baltimore, Md.	Muncy, City Flouring Mills, Inc.	680	7.64	37.94	41-43
37	Dirigo Brand, W. Newton Smith, Baltimore, Md.	Hanover, George Hull & Sons.	37	8.22	39.00	41-43
57	Dirigo Brand, W. Newton Smith, Baltimore, Md.	Elizabethtown, Muth Bros.	57	7.95	39.69	41-43
840	Dirigo Brand, W. Newton Smith, Baltimore, Md.	Lewisburg, E. C. Noll, ..	840	8.50	40.56	41-43
10	Dirigo Brand, W. Newton Smith, Baltimore, Md.	York, H. H. Smyser,	10	8.06	40.56	41-43
	Average,			8.01	40.01	.....
703	Aurora Brand, Southern Cot- ton Oil Co., Charlotte, N. C.	Miffin, W. H. Manbeck & Co.	703	7.16	42.69	41.00
716	Aurora Brand, Southern Cot- ton Oil Co., Charlotte, N. C.	Port Royal, Port Royal Grain Elevator.	716	8.46	39.75	41.00
	Average,			7.81	41.22	.....
93	Ponita Brand, Southern Cot- ton Oil Co., Charlotte, N. C.	Middletown, Brinser Mill- ing & Feed Co.	93	7.59	39.13	39.63-40
1063	Texoma Brand Choice, Texas Coke & Linter Co., Dallas, Texas.	Luxerne, H. N. Schooley & Son.	1063	8.53	42.60	41.00
289	Chippewa Choice, Traders & Producers Supply Co., Buff- alo, N. Y.	Bradford, Smith Bros., ..	289	8.11	40.56	41-43
728	Durjan Brand Choice, Union Brokerage & Commission Co., Vicksburg, Miss.	Ant's Fort, Gheen Spigel- meyer & Phleger.	728	8.46	39.82	41.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 6.79	Per ct. 7.50	Per ct. 11.36	Per ct. 9.00	Per ct. 1.85	.....	Cottonseed meal and excessive amount of hulls.	613
7.53	6.50	8.73	10.00	1.65	Made from cottonseed,	As certified,	454
7.12	6.50	10.72	10.00	2.25	Made from cottonseed,	As certified,	294
7.41	6.50	8.53	10.00	36.00	Made from cottonseed,	As certified,	285
7.35	.....	9.22	.....	33.00			
7.77	6-9	8.04	8-10	1.70	Decorticated cottonseed,	As certified,	1064
8.21	6-9	7.73	8-10	1.80	Decorticated cottonseed,	As certified,	756
8.54	6-9	10.46	8-10	1.75	Fully decorticated cottonseed.	Cottonseed meal,	92
8.33	6-9	9.06	8-10	1.70	Decorticated cottonseed,	As certified,	421
8.31	6-9	8.12	8-8.5	34.00	Decorticated cottonseed,	As certified,	543
8.34	.....	8.75	.....	34.00			
6.75	6-6.5	10.36	10.00	33.00	Made from pressed cottonseed.	As certified,	1006
7.37	7-8	11.73	9-10	1.90	Decorticated cottonseed,	Cottonseed meal and excessive amount of hulls.	608
6.91	7-8	10.37	9-10	1.65	Decorticated cottonseed,	As certified,	1092
7.14	.....	11.07	.....	35.50			
7.68	7-9	9.07	6-10.5	21.00	Decorticated cottonseed,	As certified,	6
7.65	7-9	11.39	6-10.5	1.70	Decorticated cottonseed,	Cottonseed meal and excessive amount of hulls.	630
8.33	7-9	11.10	6-10.5	22.00	Decorticated cottonseed,	As certified,	37
7.22	7-9	11.37	6-10.5	1.60	Decorticated cottonseed,	As certified,	57
9.27	7-9	9.62	6-10.5	34.00	Decorticated cottonseed,	As certified,	510
8.21	7-9	10.53	6-10.5	31.00	Decorticated cottonseed,	As certified,	19
8.09	.....	10.65	.....	32.33			
8.18	7.00	10.61	10.00	1.70	Made from cottonseed,	As certified,	708
9.35	7.00	10.70	10.00	1.70	Made from cottonseed,	Cottonseed meal and excessive amount of hulls.	716
8.77	.....	10.65	.....	34.00			
7.21	6.00	10.96	10.00	1.65	Made from cottonseed,	As certified,	36
6.66	6-8	9.30	8-10	1.85	Decorticated cottonseed,	As certified,	1053
8.41	7.50	12.02	14.00	32.00	.....	Cottonseed meal	450
7.33	7.50	10.23	10.00	1.85	Decorticated cottonseed,	Cottonseed meal and excessive amount of hulls.	738

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
876	Magnolia Brand Prime Grade, Union Brokerage & Commission Co., Vicksburg, Miss.	Bradford, L. A. Fischer & Co.	376	Per ct. 7.47	Per ct. 49.33	Per ct. 33.62
1219	Choice, Union Seed & Fertilizer Co., New York, N. Y.	Linesville, Linesville Milling Co.	1219	8.60	42.63	41.13
826	Choice, Union Seed & Fertilizer Co., New York, N. Y.	Carnegie, Richey & Carlisle.	826	8.86	43.50	41.13
906	Choice, Union Seed & Fertilizer Co., New York, N. Y.	Butler, B. F. Shannon & Co.	906	8.90	43.56	41.13
		Average,		8.78	43.90	.....
		Total average,		8.12	41.71	.....
	Linseed Meal, N. P.					
30	Cleveland Flaxmeal, American Linseed Co., New York, N. Y.	Hanover, W. J. Young & Co.	30	7.20	40.33	36.00
930	Hypro Pure, American Linseed Co., New York, N. Y.	Canton, H. Rockwell & Son.	930	9.71	37.75	36.00
		Average,		8.45	39.07	.....
	Linseed Meal, O. P.					
513	..... American Linseed Co., New York, N. Y.	Sunbury, Blank & Gotshall.	513	9.63	37.33	34.00
423	..... American Linseed Co., New York, N. Y.	Westfield, H. Z. Pride & Son.	423	9.21	36.56	34.00
		Average,		9.42	37.32	.....
846	Amco, American Milling Co., Peoria, Ill.	Lewisburg, Buffalo Flour Mfg. Co.	846	8.84	33.33	30.00
521	Amco, American Milling Co., Peoria, Ill.	Danville, Danville Milling Co.	521	9.62	22.44	30.00
443	Amco, American Milling Co., Peoria, Ill.	Knoxville, Deerfield Milling Co.	443	8.79	30.31	30.00
400	Amco, American Milling Co., Peoria, Ill.	Emporium, Emporium Milling Co.	400	9.23	25.33	30.00
1038	Amco, American Milling Co., Peoria, Ill.	Hazleton, George W. Engle.	1038	9.87	34.33	30.00
640	Amco, American Milling Co., Peoria, Ill.	St. Marys, Hall Kaul & Hyde Co.	640	10.07	35.31	30.00
963	Amco, American Milling Co., Peoria, Ill.	Carlisle, Frank E. Thompson.	963	10.00	32.13	30.00
1174	Amco, American Milling Co., Peoria, Ill.	Tarentum, R. J. Toefer.	1174	9.76	30.63	30.00
		Average,		9.52	33.00	.....
658	..... Archer-Daniels Linseed Co., Minneapolis, Minn.	Ridgway, Charles O. Salberg.	658	9.47	35.25	33.00
787	Pure, Spencer Kellogg & Sons, Inc., Buffalo, N. Y.	Corry, Acme Milling Co.,	787	9.04	32.69	33.00
667	Pure, Spencer Kellogg & Sons, Inc., Buffalo, N. Y.	Williamsport, F. W. Dawson & Son.	667	8.29	35.94	33.00
921	Pure, Spencer Kellogg & Sons, Inc., Buffalo, N. Y.	Canton, Preston Bros., ..	921	9.35	35.38	33.00
		Average,		8.89	34.34	.....
436	Pure, The Mann Brothers Co., Buffalo, N. Y.	Knoxville, J. H. Burch, ..	436	8.77	36.56	34-37
630	Pure, The Mann Brothers Co., Buffalo, N. Y.	DuBois, A. T. Sprankle,	630	8.60	36.44	34-37
		Average,		8.68	36.50	.....
809	..... The Metzger Seed & Oil Co., Toledo, Ohio.	Reynoldsville, Fales Grocery Co.	809	8.69	34.44	30-36
633	..... The Metzger Seed & Oil Co., Toledo, Ohio.	DuBois, Timlin, Kelly & Co.	633	9.34	35.44	30-36
		Average,		9.01	34.94	.....

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 9.08	Per ct. 7.50	Per ct. 8.94	Per ct. 10.00	Per ct. 1.60	.....	Cottonseed meal,	876
8.98	8.00	8.84	10.00	1.75	.....	Cottonseed meal,	1219
7.79	8.00	8.03	10.00	1.80	.....	Cottonseed meal,	825
7.32	8.00	8.68	10.00	1.75	.....	Cottonseed meal,	906
8.03	.....	8.51	.....	35.33	.....	
7.77	.....	9.72	.....	34.44	.....	
2.48	2.00	8.52	9.00	2.00	.....	Linseed oil meal,	30
2.67	2.00	8.91	9.00	1.90	.....	Linseed oil meal,	980
2.68	.....	8.71	.....	1.95	.....	
5.26	5.00	7.85	8.00	44.00	.....	Linseed oil meal,	513
5.99	5.00	7.86	8.00	2.25	.....	Linseed oil meal,	423
5.67	.....	7.85	.....	44.50	.....	
7.12	5.00	8.18	10.00	39.00	Flaxseed products, ...	As certified,	846
7.30	5.00	8.67	10.00	2.00	Flaxseed products, ...	Linseed oil meal and small amount of screenings,	521
6.98	5.00	9.78	10.00	37.00	Flaxseed products, ...	As certified,	443
7.43	5.00	8.25	10.00	2.00	Flaxseed products, ...	As certified,	400
6.69	5.00	7.45	10.00	2.30	Flaxseed products, ...	As certified,	1088
7.40	5.00	8.22	10.00	1.90	Flaxseed products, ...	As certified,	640
7.95	5.00	8.88	10.00	2.00	Flaxseed products, ...	As certified,	963
6.54	5.00	8.85	10.00	2.10	Flaxseed products, ...	As certified,	1174
7.16	.....	8.58	.....	40.00	.....	
6.52	6.00	7.23	10.00	2.50	.....	Linseed oil meal,	658
5.85	5.00	8.86	10.00	1.75	Made from linseed cake,	As certified,	787
6.04	5.00	5.97	10.00	2.15	Made from linseed cake,	As certified,	667
5.53	5.00	7.91	10.00	1.80	.....	Linseed oil meal,	921
5.81	.....	7.58	.....	38.00	.....	
7.48	6-7	7.96	5-10	1.80	.....	Linseed oil meal,	436
6.93	6-7	8.30	5-10	2.00	.....	Linseed oil meal,	630
7.21	.....	8.13	.....	33.00	.....	
6.69	5-7	8.28	2-10	2.25	.....	Linseed oil meal,	809
6.27	5-7	8.76	2-10	2.00	.....	Linseed oil meal,	633
6.48	.....	8.57	.....	42.50	.....	

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
816	..... Midland Linseed Products Co., Minneapolis, Minn.	Scottdale, J. E. Pritts.	816	Per ct. 9.42	Per ct. 35.94	Per ct. 32.00
1133	Ground Linseed Cake, Milwaukee Linseed Oil Works, Milwaukee, Wis.	E. Downingtown, J. W. Maxwell.	1133	9.79	36.31	32.35
189	Oil Meal as Stock Food, Thompson & Company, Pittsburgh, Pa.	Bedford, N. M. & O. K. Diehl	189	9.58	34.31	30-37.5
201	Oil Meal as Stock Food, Thompson & Company, Pittsburgh, Pa.	Huntingdon, Huntingdon Milling Co.	201	10.47	33.75	30-37.5
1260	Oil Meal as Stock Food, Thompson & Company, Pittsburgh, Pa.	Hays, John Sachman & Co.	1260	9.32	33.83	30-37.5
481	Oil Meal as Stock Food, Thompson & Company, Pittsburgh, Pa.	New Brighton, M. H. Stager.	481	9.35	34.31	30-37.5
1196	Oil Meal as Stock Food, Thompson & Company, Pittsburgh, Pa.	Indiana, St Clair, Rinn & Co.	1196	9.42	33.13	30-37.5
		Average,		9.62	33.78	.....
433	..... The Toledo Seed & Oil Co., Toledo, Ohio.	Elkland, Elkland Roller Mills.	433	9.80	34.31	30.00
417	..... The Toledo Seed & Oil Co., Toledo, Ohio.	Coudersport, Gates Bros.	417	8.83	32.75	30.00
888	..... The Toledo Seed & Oil Co., Toledo, Ohio.	Butler, H. J. Kilgler & Co.	888	9.32	30.44	30.00
697	..... The Toledo Seed & Oil Co., Toledo, Ohio.	McVetown, John T. Rodgers.	697	9.32	30.94	30.00
653	..... The Toledo Seed & Oil Co., Toledo, Ohio.	Ridgway, Smith Bros. Co.	653	9.60	33.06	30.00
114	..... The Toledo Seed & Oil Co., Toledo, Ohio.	Johnstown, Swope Bros.,	114	9.67	33.94	30.00
173	..... The Toledo Seed & Oil Co., Toledo, Ohio.	Windber, Weaver & Berkey.	173	10.27	31.94	30-36
		Average,		9.71	33.48	.....
		Total average,		9.48	34.14	.....
COCOANUT OIL MEAL.						
449	Copra Cake Meal, M. F. Baringer, Philadelphia, Pa.	Mansfield, Equity Co-Operative Exchange.	449	5.54	20.56	24.67
1040	Copra Cake Meal, M. F. Baringer, Philadelphia, Pa.	Hasleton, John Kirschner.	1040	10.06	22.50	24.60
923	Copra Cake Meal, M. F. Baringer, Philadelphia, Pa.	Troy, Preston & Jaquish.	923	9.40	21.94	24.67
		Average,		8.33	21.65	.....
1099	..... Shepard-Clark & Co., Cleveland, Ohio.	Sharon, Sharon Flour & Feed Co.	1099	6.47	24.69	21-25
		Total average,		7.96	23.41	.....
CORN OIL MEAL.						
413	Homcoline Feed, American Hominy Co., Indianapolis, Ind.	Coudersport, Eulalia Mills,	413	2.50	20.56	17.00
DISTILLERY AND BREWERY BY-PRODUCTS.						
Distillers' Dried Grains. (Largely from Corn.)						
1063	Ajax Flakes, Ajax Milling & Feed Co., Hammond, Ind.	Montrose, Andre & Sweet,	1063	8.01	31.69	30.00
442	Ajax Flakes, Ajax Milling & Feed Co., Hammond, Ind.	Knoxville, Deerfield Milling Co.	442	6.67	33.13	30.00
1249	Ajax Flakes, Ajax Milling & Feed Co., Hammond, Ind.	Erie, Erie Milling & Supply Co.	1249	6.91	31.62	30.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 8.28	Per ct. 5.00	Per ct. 7.95	Per ct. 9.00	Per ct. 3.10	.....	Linseed oil meal,	316
6.84	5-8	7.92	9-10	2.00	.....	Linseed oil meal,	1133
6.48	5.5-6.5	8.22	6-11	46.00	.....	Linseed oil meal,	139
6.75	5.5-8.5	8.22	6-11	3.25	.....	Linseed oil meal,	201
7.42	5-8.5	8.75	6-11	2.50	.....	Linseed oil meal,	1280
6.65	5.5-8.5	8.29	6-11	2.10	.....	Linseed oil meal,	481
7.24	5.5-8.5	8.58	6-11	2.25	.....	Linseed oil meal,	1195
6.91	.....	8.39	.....	45.60	.....	.....	.....
5.79	5.00	8.44	10.00	2.10	.....	Linseed oil meal,	433
6.13	5.00	9.96	10.00	2.10	.....	Linseed oil meal,	417
6.58	5.00	9.00	10.00	1.90	.....	Linseed oil meal,	838
6.10	5.00	4.18	10.00	3.00	.....	Linseed oil meal,	697
6.18	5.00	8.72	10.00	2.50	.....	Linseed oil meal,	653
7.00	5.00	7.95	10.00	44.00	.....	Linseed oil meal,	114
6.70	5-7	8.96	2-10	2.00	.....	Linseed oil meal,	173
6.35	.....	8.18	.....	42.29	.....	.....	.....
6.69	.....	8.20	.....	41.83	.....	.....	.....
9.15	8.20	8.73	10.00	2.00	.....	Cocoanut oil meal,	449
7.72	8.20	9.75	10.25	1.85	.....	Cocoanut oil meal,	1040
8.09	8.20	8.89	10.00	2.00	.....	Cocoanut oil meal,	933
8.32	.....	9.13	.....	1.95	.....	.....	.....
12.45	7-10	9.02	10.00	1.75	Made from the pure dried meat of the cocoanut.	Cocoanut oil meal,	1099
9.85	.....	9.00	.....	1.90	.....	.....	.....
8.92	5.00	6.11	7.00	1.75	A pure white corn product.	Corn oil meal,	413
11.35	11.00	10.88	14.00	1.80	.....	Distillers dried grains (largely from corn).	1063
12.01	11.00	12.10	14.00	35.00	Corn distillers grains, As certified, .....	.....	442
10.23	11.00	11.77	14.00	33.00	Corn distillers grains, As certified, .....	.....	1249

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
394	Ajax Flakes, Ajax Milling & Feed Co., Hammond, Ind.	Smethport, F. A. Greene,	394	Per ct. 6.22	Per ct. 30.56	Per ct. 30.00
1120	Ajax Flakes, Ajax Milling & Feed Co., Hammond, Ind.	Parkeburg, E. H. Keen & Son.	1120	7.54	29.81	30.00
418	Ajax Flakes, Ajax Milling & Feed Co., Hammond, Ind.	Westfield, H. Z. Pride & Son.	418	6.96	30.06	30.00
929	Ajax Flakes, Ajax Milling & Feed Co., Hammond, Ind.	Canton, H. Rockwell & Son.	929	8.41	30.94	30.00
1242	Ajax Flakes, Ajax Milling & Feed Co., Hammond, Ind.	Belle Valley, Schrimper Brothers.	1242	6.45	20.44	30.00
	Average,			7.14	30.91	.....
377	Empire State Dairy Feed, Clarke Brothers & Co., Peoria, Ill.	Bradford, L. A. Fischer & Co.	377	5.35	22.44	30-33
909	Eagle Three D, The Dewey Brothers Co., Blanchester, Ohio.	Butler, B. F. Shannan & Co.	909	7.16	31.31	30.00
13	Eagle Three D, The Dewey Brothers Co., Blanchester, Ohio.	York, H. H. Smyser, ..	13	8.19	31.81	30-33
22	Eagle Three D, The Dewey Brothers Co., Blanchester, Ohio.	York, Strayer Brothers Co.	22	6.20	31.31	30-33
	Average,			7.18	31.64	.....
445	Columbia, Grain Products Sales Co., Buffalo, N. Y.	Mansfield, Equity Co-operative Exchange.	445	7.81	24.06	30-33
1122	Hector, Hottel & Co., Milwaukee, Wis.	Centerville, Handwork Brothers.	1122	5.74	31.44	30-33
210	Fourax, The Ubiko Milling Co., Cincinnati, Ohio.	Phimyra, J. H. Kettering & Son.	210	7.57	31.25	31.00
	Total average,			6.97	31.42	.....
	Distillers' Dried Grains. (Largely from Rye.)					
439	Eddington Feed, William H. Stelmann, Baltimore, Md.	Knoxville, Deerdfield Milling Co.	439	6.83	20.33	20.81
	Distillers' and Yeast. Dried Grains.					
227	..... M. F. Baringer, Philadelphia, Pa.	Cleona, John H. Long,	227	7.13	19.56	19-22
926	..... M. F. Baringer, Philadelphia, Pa.	Canton, H. Rockwell & Son.	926	7.92	19.94	20-23
713	..... M. F. Baringer, Philadelphia, Pa.	Lewistown, Spanogle-Yeager Milling Co.	713	5.71	21.00	20-23
	Average,			6.96	20.17	.....
1044	Continental Gluten Feed, Continental Cereal Co., Peoria, Ill.	Hazleton, John G. Saeger's Sons.	1044	8.28	23.75	23-24
9	Corby, The Corby Co., Washington, D. C.	York, H. H. Smyser,	9	6.27	20.83	17.00
1062	Ivy, Illinois Vinegar Manufacturing Co., Chicago, Ill.	Montrose, Andre & Sweet,	1062	7.44	18.63	19.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 11.03	Per ct. 11.00	Per ct. 9.77	Per ct. 14.00	Per ct. 1.85	.....	Distillers dried grains (largely from corn). As certified,	894
10.56	11.00	12.12	14.00	32.00	Corn distillers grains,	As certified,	1130
11.40	11.00	8.82	14.00	1.90	Corn distillers grains,	As certified,	413
10.75	11.00	9.03	14.00	1.80	Corn distillers grains,	As certified,	929
11.75	11.00	10.92	14.00	32.00	Corn distillers grains,	As certified,	1242
11.14	.....	10.67	.....	35.00	.....	.....	.....
10.37	12-14	7.17	9-12	1.75	.....	Distillers dried grains (largely from corn).	877
13.74	10.00	10.42	13.00	1.80	.....	Distillers dried grains (largely from corn).	909
13.96	10-15	12.29	8-13	34.00	.....	Distillers dried grains (largely from corn).	13
10.62	10-15	7.78	8-12	37.00	.....	Distillers dried grains (largely from corn).	23
12.78	.....	10.16	.....	35.67	.....	.....	.....
13.32	10-12	11.50	14.00	1.80	.....	Distillers dried grains (largely from corn).	445
11.74	10-12	12.58	14.00	36.00	.....	Distillers dried grains (largely from corn).	1122
12.22	12.00	11.90	13.00	35.00	.....	Distillers dried grains (largely from corn).	210
11.67	.....	10.00	.....	35.27	.....	.....	.....
5.56	8.46	10.04	11.82	27.00	.....	Distillers dried grains (largely from rye).	439
7.53	5.5-7	16.32	25.00	1.82	.....	Distillers and yeast from corn, rye, malt and barley malt	237
6.86	6-8	16.87	18.00	1.40	.....	Distillers and yeast from corn, rye, malt and barley malt	926
7.06	6-8	17.46	18.00	1.40	.....	Distillers and yeast from corn, rye, malt and barley malt	718
7.15	.....	16.88	.....	1.64	.....	.....	.....
9.03	10-15	6.49	7-10	1.70	A distillery by-product manufactured from corn, oats, rye and barley.	Distillers dried grains from corn, oats, rye and barley.	1044
8.12	8.00	17.44	20.00	27.00	From the manufacture of compressed yeast, barley, malt, rye malt, malt sprouts and corn.	Dried yeast grains from corn, rye, malt, barley, malt and malt sprouts.	9
7.00	7.00	17.42	19.00	1.30	Made from corn, barley, malt and sprouts	Dried yeast grains from corn, barley, malt and malt sprouts.	1062

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
	Brewers' Dried Grains.			Per ct.	Per ct.	Per ct.
159	Steam, Anheuser-Busch Brewing Association, St. Louis, Mo.	Somerset, H. C. Beerits' Sons.	159	6.29	23.63	24-23
844	..... M. F. Baringer, Philadelphia, Pa.	Lewisburg, Buffalo Flour Milling Co.,	844	7.08	25.63	25.00
447	..... M. F. Baringer, Philadelphia, Pa.	Mansfield, Equity Co-operative Exchange.	447	7.36	26.33	25.00
1056	..... M. F. Baringer, Philadelphia, Pa.	Luzerne, Luzerne Milling Co.	1056	7.97	24.63	25.00
	Average,			7.47	25.57	.....
1124	Stockade Fancy, Jonas F. Eby & Son, Lancaster, Pa.	Coatesville, Handwork Brothers.	1124	7.10	29.44	23.00
1127	Stockade Fancy, Jonas F. Eby & Son, Lancaster, Pa.	Parkeburg, E. H. Keen & Son.	1127	7.00	27.94	23.00
	Average,			7.00	28.69	.....
408	Bull Brand, Farmers' Feed Co., Buffalo, N. Y.	Coudersport, Eulalia Mills,	408	7.07	30.50	27.2
379	Bull Brand, Farmers' Feed Co., Buffalo, N. Y.	Bradford, L. A. Fischer & Co.	379	7.54	24.75	27.2-30
836	Bull Brand, Farmers' Feed Co., Buffalo, N. Y.	Milton, C. H. McMahan, .	836	6.93	27.83	27.2-30
370	Bull Brand, Farmers' Feed Co., Buffalo, N. Y.	Clearfield, J. T. Murphy,	370	5.46	29.06	27.2
20	Bull Brand, Farmers' Feed Co., Buffalo, N. Y.	York, Strayer Bros. Co.,	20	7.23	23.13	27.2
	Average,			6.35	28.06	.....
837	Pure, Fuhrmann & Schmidt Brewing Co., Shamokin, Pa.	Milton, C. H. McMahan,	837	5.75	28.00	25.00
511	Holstein, The Hottel Co., Milwaukee, Wis.	Sunbury, Blank & Gottshall.	511	8.21	27.33	25-27
1137	Holstein, The Hottel Co., Milwaukee, Wis.	Downingtown, H. C. Clark-son.	1137	6.13	23.25	25.00
1141	Holstein, The Hottel Co., Milwaukee, Wis.	West Chester, C. C. Hipple & Son.	1141	6.95	29.50	25.00
	Average,			7.11	23.54	.....
815	..... Independent Brewing Co. of Pittsburgh, Pittsburgh, Pa.	Wilkesburg, Johnson & Smith.	815	5.59	21.50	13.90
140	..... Johnstown Dry Grains Co., Johnstown, Pa.	Johnstown, G. Bostert & Son.	140	8.05	27.33	24.00
683	Crown, Milwaukee Grains & Feed Co., Milwaukee, Wis.	Muncy, City Flouring Mills, Inc.	683	7.21	31.94	25.00
81	Crown, Milwaukee Grains & Feed Co., Milwaukee, Wis.	Manheim, Lancaster Co. Farmers' Ass'n.	81	7.55	30.25	25.00
	Average,			7.33	31.10	.....
1143	Goldness Kalb, K. & E. Newmond, St. Louis, Mo.	West Chester, I. H. Bailey	1143	5.53	19.00	24.00
1123	Goldness Kalb, K. & E. Newmond, St. Louis, Mo.	Parkeburg, E. H. Keen & Son.	1123	7.46	27.25	24.00
	Average,			6.52	23.13	.....
1076	..... The Penna. Central Brewing Co., Scranton, Pa.	Scranton, Miner-Hillard Milling Co.	1076	5.58	25.31	23.71
1129	Peerless, Penn Grains & Feed Co., Phila., Pa.	Parkeburg, E. H. Keen & Co.	1129	6.53	23.13	25.00
1135	Peerless, Penn Grains & Feed Co., Phila., Pa.	E. Downingtown, J. W. Maxwell.	1135	7.74	27.75	23.00
	Average,			7.13	27.37	.....
831	Eagle A, Ralston Purina Co., St. Louis, Mo.	Milton, W. E. Custer, .	831	7.37	31.50	21-27

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct.	Per ct.	Per ct.	Per ct.	Per ct.			
5.78	7-8	16.80	13-15	31.00	.....	Brewers' dried grains,	159
6.91	6.00	14.77	15.00	30.00	.....	Brewers' dried grains,	844
7.19	6.00	15.60	15.00	1.50	.....	Brewers' dried grains,	447
7.17	6.00	15.00	15.00	1.50	.....	Brewers' dried grains,	1066
7.00	.....	15.15	.....	30.00			
7.06	6.50	14.16	13.00	26.00	.....	Brewers' dried grains,	1124
7.11	6.50	14.11	13.00	26.00	.....	Brewers' dried grains,	1127
7.06	.....	14.13	.....	28.50			
7.27	6.3-7.2	11.46	16.17 -17.2	1.55	.....	Brewers' dried grains,	408
6.57	6.3-8	13.63	16.17 -17.2	1.75	.....	Brewers' dried grains,	379
7.06	6.3-8	14.06	16.17 -17.2	.....	.....	Brewers' dried grains,	836
7.23	6.3-7.3	13.06	16.17 -17.3	1.38	.....	Brewers' dried grains,	370
6.55	6.3-7.3	13.63	16.17 -17.2	30.00	.....	Brewers' dried grains,	20
6.93	.....	13.21	.....	33.40			
6.20	6.34	12.67	15.99	.....	.....	Brewers' dried grains,	837
6.66	5-7	14.12	14-17	26.00	.....	Brewers' dried grains,	511
6.85	5.00	14.36	14.00	29.00	.....	Brewers' dried grains,	1137
6.82	5.00	13.30	14.00	23.00	.....	Brewers' dried grains,	1141
6.78	.....	14.00	.....	26.33			
8.13	6.63	15.73	19.03	1.50	.....	Brewers' dried grains,	315
8.28	6.71	13.75	15.66	1.40	.....	Brewers' dried grains,	140
6.92	5.00	12.16	15.00	1.40	.....	Brewers' dried grains,	633
6.50	5.00	13.06	15.00	26.00	.....	Brewers' dried grains,	81
6.71	.....	13.61	.....	27.00			
4.74	6.00	10.45	13.00	28.00	.....	Brewers' dried grains,	1142
7.73	6.00	14.73	13.00	23.00	.....	Brewers' dried grains,	1128
6.24	.....	12.61	.....	26.00			
6.95	7.14	14.60	15.35	1.50	.....	Brewers' dried grains,	1076
7.54	6.00	13.98	13.00	26.00	.....	Brewers' dried grains,	1129
6.75	6.00	13.68	12.00	29.00	.....	Brewers' dried grains,	1135
7.15	.....	13.33	.....	23.50			
6.23	6-8	11.96	15-18	1.50	Brewers dried grains from barley.	As certified,	831

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
1046	..... Reichard & Weaver, Wilkes-Barre, Pa.	Nanticoke, Gibbs Milling Co.	1046	Per ct. 7.31	Per ct. 20.81	Per ct. 24.35
1024	..... Reichard & Weaver Wilkes-Barre, Pa.	Wilkes-Barre, Miner-Hill lard Milling Co.	1024	7.20	22.75	24.35
		Average,		7.25	22.78	.....
1014	..... Stegmaier Brewing Co., Wilkes-Barre, Pa.	Wilkes-Barre, C. P. Matthews & Sons, Inc.	1014	9.33	23.44	23.70
117	..... Swope Brothers, Johnstown, Pa.	Johnstown, Swope Bros.,	117	7.71	23.13	23.33
1173	..... Western Grains & Feed Co., Chicago, Ill.	Turtle Creek, F. J. Riddle	1173	7.45	27.13	25.00
		Total average,		7.06	27.55	.....
	Malt Sprouts.					
245	Higuality, Donahue-Stratton Co., Milwaukee, Wis.	Reading, Aug. C. Werts & Bro.	245	4.11	23.75	25.00
1246	..... John Kam Malting Co., Buffalo, N. Y.	Erie, Erie Milling & Supply Co.	1246	3.45	23.31	25.00
		Average,		3.78	23.53	.....
	MAIZE BY-PRODUCTS.					
	Corn Gluten Feed.					
239	Cream of Corn, American Maize Products Co., New York, N. Y.	Annaville, Newgard & Bachman.	239	10.19	25.54	23-25
562	Cream of Corn, American Maize Products Co., New York, N. Y.	Vintage, Paradise Farmers Ass'n, Inc.	562	9.21	25.19	22-25
408	Cream of Corn, American Maize Products Co., New York, N. Y.	Emporium, E. J. Rogers.	408	10.92	27.50	23-25
1159	Cream of Corn, American Maize Products Co., New York, N. Y.	Derry, L. A. Wheeler, ..	1159	9.16	27.00	24.00
229	Cream of Corn, American Maize Products Co., New York, N. Y.	Myerstown, S. T. Yost, ...	229	9.30	25.32	23-25
		Average,		9.75	26.13	.....
220	Clinton, Clinton Sugar Refining Co., Clinton, Iowa.	Palmyra, Early & Detweiler.	220	8.33	26.31	23.00
1066	Clinton, Clinton Sugar Refining Co., Clinton, Iowa.	Montrose, Harrington & Wilson.	1066	9.23	27.19	23.00
		Average,		8.78	27.00	.....
738	Buffalo, Corn Products Refining Co., New York, N. Y.	Corry, Acme Milling Co.,	738	8.90	26.00	23.00
1221	Buffalo, Corn Products Refining Co., New York, N. Y.	Erie, A. P. Allen,	1221	8.20	25.63	23.00
847	Buffalo, Corn Products Refining Co., New York, N. Y.	Lewisburg, Buffalo Flour Milling Co.	847	9.30	27.31	23.00
681	Buffalo, Corn Products Refining Co., New York, N. Y.	Muncy, City Flouring Mills, Inc.	681	8.69	29.44	23.00
411	Buffalo, Corn Products Refining Co., New York, N. Y.	Coudersport, Eulalia Mills	411	8.68	27.31	23.00
811	Buffalo, Corn Products Refining Co., New York, N. Y.	Reynoldsville, Fales Grocery Co.	811	10.34	27.50	23.00
939	Buffalo, Corn Products Refining Co., New York, N. Y.	Troy, Farmers' & Consumers' Commercial Union.	939	8.80	29.44	23.00
471	Buffalo, Corn Products Refining Co., New York, N. Y.	Monaca, Monaca Roller Mills.	471	9.30	27.50	23.00
1107	Buffalo, Corn Products Refining Co., New York, N. Y.	Charleroi, R. C. Mountzer	1107	7.30	27.31	23.00
274	Buffalo, Corn Products Refining Co., New York, N. Y.	Mt. Penn, Neln Brothers,	274	7.53	25.31	23.00
100	Buffalo, Corn Products Refining Co., New York, N. Y.	Harrisburg, Faxton Flour & Feed Co.	100	8.26	23.44	23.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct.	Per ct.	Per ct.	Per ct.	Per ct.			
7.44	5.21	12.46	.....	1.50	.....	Brewers' dried grains,	1046
7.19	5.21	8.02	.....	1.50	.....	Brewers' dried grains,	1024
7.32	.....	10.24	.....	1.50	.....	
6.89	6.30	12.06	16.25	30.00	.....	Brewers' dried grains,	1014
7.30	7.16	12.20	14.92	25.00	.....	Brewers' dried grains,	117
7.32	5.00	12.81	16.00	1.65	.....	Brewers' dried grains,	1178
6.98	.....	12.49	.....	29.62	.....	
1.13	1.50	12.85	14.00	1.50	.....	Malt sprouts,	245
1.44	.75-1.5	9.63	16.00	26.00	.....	Malt sprouts,	1246
1.29	.....	11.74	.....	29.00	.....	
3.98	2.50	6.06	8.50	30.00	.....	Corn gluten feed,	239
2.30	2.50	6.53	8.50	31.50	.....	Corn gluten feed,	563
4.21	2.50	5.71	8.50	1.25	.....	Corn gluten feed,	408
2.27	1.50	6.09	8.50	22.00	.....	Corn gluten feed,	1159
2.29	2.50	6.41	8.50	1.00	.....	Corn gluten feed,	229
2.61	.....	6.16	.....	22.50	.....	
2.71	2.00	6.71	8.00	1.55	.....	Corn gluten feed,	220
2.88	2.00	6.47	8.00	1.55	.....	Corn gluten feed,	1066
2.80	.....	6.59	.....	31.00	.....	
2.22	1.00	7.50	8.50	1.50	.....	Corn gluten feed,	786
2.11	1.00	8.07	8.50	27.00	Corn gluten feed,	As certified,	1231
3.98	1.00	6.81	8.50	23.00	Corn gluten feed,	As certified,	847
2.44	1.00	6.72	8.50	1.60	Corn gluten feed,	As certified,	681
3.85	1.00	6.69	8.50	1.75	Corn gluten feed,	As certified,	411
2.75	1.00	6.45	8.50	1.60	Corn gluten feed,	As certified,	811
2.97	1.00	6.15	8.50	1.40	Corn gluten feed,	As certified,	969
2.25	1.00	7.42	8.50	1.60	Corn gluten feed,	As certified,	471
2.27	1.00	6.79	8.50	1.60	Corn gluten feed,	As certified,	1107
6.00	2.00	7.27	8.50	1.60	Corn gluten feed,	As certified,	274
2.40	1.00	6.29	8.50	1.70	Corn gluten feed, ...	As certified,	100

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
1234	Buffalo, Corn Products Refining Co., New York, N. Y.	Wesleyville, W. D. Rupley	1234	Per ct. 8.20	Per ct. 27.00	Per ct. 23.00
646	Buffalo, Corn Products Refining Co., New York, N. Y.	St. Marys, Leonard Ritter	646	10.76	28.28	23.00
502	Buffalo, Corn Products Refining Co., New York, N. Y.	Rochester, Rochester Seed & Supply Co.	502	9.07	26.94	23.00
381	Buffalo, Corn Products Refining Co., New York, N. Y.	Bradford, Smith Brothers,	381	8.35	27.63	23.00
25	Buffalo, Corn Products Refining Co., New York, N. Y.	York, Strayer Bros. Co.,	25	8.49	28.81	23.00
454	Buffalo, Corn Products Refining Co., New York, N. Y.	Mansfield, Sun Milling Co.	454	8.06	27.06	23.00
	Average,			8.73	27.53	.....
481	Douglas, Douglas & Co., Cedar Rapids, Iowa.	Elkland, Elkland Roller Mills.	481	10.46	26.00	23-25
551	Douglas, Douglas & Co., Cedar Rapids, Iowa.	Rouks, E. D. Leaman,	551	10.91	24.81	.....
1023	Douglas, Douglas & Co., Cedar Rapids, Iowa.	Wilkes-Barre, Miner-Hillard Milling Co.	1023	9.62	24.81	23-25
629	Douglas, Douglas & Co., Cedar Rapids, Iowa.	DuBois, A. T. Sprankle,	629	10.36	24.19	23-25
778	Douglas, Douglas & Co., Cedar Rapids, Iowa.	Corry, R. H. Van Tassel,	778	9.50	29.81	23-25
223	Douglas, Douglas & Co., Cedar Rapids, Iowa.	Avon, Charles Z. Weiss,	223	9.35	23.75	23-25
	Average,			10.03	25.56	.....
542	..... Jonas F. Eby & Son, Lancaster, Pa.	Bird-in-hand, J. A. Umble & Bro.	542	9.65	25.31	23-25
249	P. Bro., Piel Bros., Starch Co., Indianapolis, Ind.	Fleetwood, H. Kaufman, Schaeffer & Co.	249	7.91	28.75	21-23
250	P. Bro., Piel Bros., Starch Co., Indianapolis, Ind.	Fleetwood, Schaeffer Wanner & Co.	250	10.00	23.63	21-23
	Average,			8.95	26.19	.....
864	Staley's, A. E. Staley Manufacturing Co., Decatur, Ill.	New Castle, City Roller Mills.	864	8.27	26.19	23-25
1008	Union, Union Starch & Refining Co., Edinburg, Ind.	Canonsburg, W. H. Dunlap, Jr.	1008	8.20	26.25	23.00
998	Union, Union Starch & Refining Co., Edinburg, Ind.	Washington, Washington Milling Co.	998	9.51	25.00	23.00
	Average,			8.85	25.63	.....
554	P. Bro., C. W. Wagar & Co., Philadelphia, Pa.	Leaman Place, Harry K. Hershey.	554	8.91	24.94	22.50
	Total average,			9.11	26.65	.....
	Corn Gluten Meal.					
936	Diamond, Corn Products Refining Co., New York, N. Y.	Troy, Farmers' & Consumers' Commercial Union.	936	7.51	45.50	40.00
879	Diamond, Corn Products Refining Co., New York, N. Y.	Pittsburgh, The I. W. Scott Co.	879	9.29	45.19	40.00
	Average,			8.35	45.35	.....
	Hominy Feed.					
308	Pearl, E. I. Bailey, Cleveland, Ohio.	Mt. Pleasant, J. H. Brown & Son.	308	9.79	11.23	9-11
1069	Pearl, E. I. Bailey, Cleveland, Ohio.	Greenville, Webber Bros.,	1069	9.10	11.44	9-11
	Average,			9.44	11.41	.....
234	..... M. F. Baringer, Philadelphia, Pa.	Myerstown, E. L. Bleistein	234	10.73	11.35	9.00
272	Ideal, Elevator Milling Co., Springfield, Ill.	Mt. Penn, Nein Bros., ...	272	9.23	11.75	11.02

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct.	Per ct.	Per ct.	Per ct.	Per ct.			
2.02	1.00	7.33	3.50	1.45	Corn gluten feed, ...	As certified,	1284
2.17	1.00	6.67	3.50	1.65	Corn gluten feed, ...	As certified,	646
4.13	1.00	7.59	3.50	1.45	Made from shelled corn and corn bran.	Corn gluten feed,	502
3.50	1.00	7.00	3.50	32.00	Corn gluten feed, ...	As certified,	331
2.70	1.00	6.86	3.50	34.00	Corn gluten feed, ...	As certified,	25
3.31	1.00	7.52	3.50	33.00	Corn gluten feed, ...	As certified,	454
3.00	.....	7.03	.....	21.59	.....	.....	.....
3.23	2.00	6.92	3.00	1.50	.....	Corn gluten feed,	431
2.97	.....	6.51	.....	29.50	.....	Corn gluten feed,	551
2.09	2.00	6.53	3.00	1.75	.....	Corn gluten feed,	1023
3.91	3.00	6.31	3.00	1.65	.....	Corn gluten feed,	629
2.29	2.00	11.50	3.00	1.50	.....	Corn gluten feed,	778
4.02	2.00	6.00	3.00	1.60	.....	Corn gluten feed,	223
3.09	.....	7.29	.....	21.53	.....	.....	.....
3.61	2.00	5.55	3.00	30.00	.....	Corn gluten feed,	542
3.24	3.00	6.22	3.00	21.50	Gluten feed artificially colored with orange No. 122.	As certified,	249
4.23	2.00	6.40	3.00	1.60	Gluten feed artificially colored with orange No. 122.	As certified,	250
3.86	.....	6.31	.....	21.75	.....	.....	.....
3.74	2.5-3	6.61	9-12	23.00	.....	Corn gluten feed,	384
4.43	3.00	6.46	3.00	29.00	.....	Corn gluten feed,	1003
5.09	3.00	2.30	3.00	1.55	.....	Corn gluten feed,	938
4.76	.....	4.23	.....	30.00	.....	.....	.....
2.94	2.50	3.13	9.00	1.65	.....	Corn gluten feed,	554
3.12	.....	6.73	.....	21.61	.....	.....	.....
1.23	1.50	1.61	4.00	1.65	.....	Corn gluten meal,	386
1.17	1.50	1.67	4.00	2.05	.....	Corn gluten meal,	379
1.20	.....	1.64	.....	1.35	.....	.....	.....
9.13	7-9	4.91	7-8	2.00	Pure corn product,	As certified,	308
7.75	7-9	4.74	7-8	1.70	Pure corn product,	As certified,	1089
3.47	.....	4.32	.....	1.35	.....	.....	.....
3.11	6.00	1.96	10.00	1.70	.....	Hominy feed,	231
3.14	7.07	5.37	.....	1.70	.....	Hominy feed,	272

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.		
					Found.	Guaranteed.	
				Per ct.	Per ct.	Per ct.	
1065	Pearl, Empire Grain & Elevator Co., Binghamton, N. Y.	Montrose, Andre & Sweet	1065	9.84	11.44	10.00	
1	Emco Evans, Evans Milling Co., Indianapolis, Ind.	York, Anderson Bros. & Co.	1	9.88	11.88	10.00	
80	Emco Evans, Evans Milling Co., Indianapolis, Ind.	Manheim, Lancaster Co. Farmers' Ass'n.	80	9.24	12.13	10.00	
1226	Emco Evans, Evans Milling Co., Indianapolis, Ind.	Linesville, Linesville Coal, Lime & Cement Co.	1226	9.84	12.00	10.00	
1095	Emco Evans, Evans Milling Co., Indianapolis, Ind.	Sharon, J. M. Porter,	1095	9.02	11.83	10.00	
695	Emco Evans, Evans Milling Co., Indianapolis, Ind.	McVeytown, John T. Rodgers.	695	9.59	11.75	10.00	
		Average,		9.51	11.93	.....
1073	Badger, Charles A. Krause Milling Co., Milwaukee, Wis.	Montrose, Brown & Fassett.	1073	9.19	12.13	10.00	
985	Badger, Charles A. Krause Milling Co., Milwaukee, Wis.	Troy, Farmers' & Consumers' Commercial Union.	985	9.63	11.69	10.00	
553	Badger, Charles A. Krause Milling Co., Milwaukee, Wis.	Leaman Place, Harry K. Hershey.	553	8.75	11.56	10.00	
209	Badger, Charles A. Krause Milling Co., Milwaukee, Wis.	Palmyra, J. H. Kettering & Son.	209	9.65	12.31	10.00	
51	Badger, Charles A. Krause Milling Co., Milwaukee, Wis.	Elizabethtown, Lehman & Wolgemuth.	51	10.05	11.31	10.00	
560	Badger, Charles A. Krause Milling Co., Milwaukee, Wis.	Vintage, Paradise Farmers' Association, Inc.	560	9.72	11.69	10.00	
		Average,		9.49	11.78	.....
1033	Choice Steam Cooked, Miner-Hillard Milling Co., Wilkes-Barre, Pa.	Wilkes-Barre, Miner-Hillard Milling Co.	1033	9.87	12.39	10-12	
1074	Choice Steam Cooked, Miner-Hillard Milling Co., Scranton, Pa.	Scranton, Miner-Hillard Milling Co.	1074	9.51	12.06	10-12	
		Average,		9.69	12.22	.....
536	..... Mystic Milling Co., Sioux City, Iowa.	Quarryville, Crowl & Greenleaf.	536	11.29	12.06	11 00	
1068	..... Mystic Milling Co., Sioux City, Iowa.	Montrose, Harrington & Wilson.	1068	9.92	11.88	11 00	
		Average,		10.60	11.97	.....
820	Challenge, Newsome Feed & Grain Co., Pittsburgh, Pa.	Carnegie, Carnegie Feed & Supply Co.	820	10.25	12.00	10.00	
320	Challenge, Newsome Feed & Grain Co., Pittsburgh, Pa.	Scottdale, City Feed Store	320	10.70	11.44	10.00	
		Average,		10.48	11.73	.....
359	Yellow, The Quaker Oats Co., Chicago, Ill.	Osceola Mills, Baird, Rickensbaugh & Co.	359	11.47	11.63	9.00	
904	Yellow, The Quaker Oats Co., Chicago, Ill.	Mars, W. J. Kennedy & Son.	904	11.06	11.63	9.00	
1176	Yellow, The Quaker Oats Co., Chicago, Ill.	Tarentum, J. A. Sharp, ..	1176	10.96	11.19	9.00	
179	Yellow, The Quaker Oats Co., Chicago, Ill.	Johnstown, A. F. Stutzman & Co.	179	11.89	11.13	9.00	
		Average,		11.34	11.40	.....
60	Logan, The Standard Cereal Co., Chillicothe, Ohio.	Elizabethtown Muth Bros.	60	6.14	12.00	9.00	
231	Logan, The Standard Cereal Co., Chillicothe, Ohio.	Myerstown, S. T. Yost, ..	231	10.79	10.81	9.00	
		Average,		8.46	11.41	.....
232	Acme, Suffern-Hunt Mills, Decatur, Ill.	Myerstown, M. B. Becker,	232	10.66	11.50	9.3-11	

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct.	Per ct.	Per ct.	Per ct.	Per ct.			
7.03	7.00	4.33	6.00	1.75		Hominy feed,	1066
9.23	7.50	5.35	7.00	21.00	Made from white corn,	As certified,	1
10.23	7.50	4.89	7.00	30.00	Made from white corn,	As certified,	80
8.95	7.50	4.77	7.00	30.00	Made from white corn,	As certified,	1226
9.04	7.50	4.73	7.00	1.75	Made from white corn,	As certified,	1066
9.93	7.50	5.00	7.00	1.75	Made from white corn,	As certified,	606
9.45	.....	4.94	.....	23.20			
8.03	6.00	5.96	5.00	1.75	Made from white corn,	As certified,	1073
8.05	6.00	5.63	5.00	1.65	Made from white corn,	As certified,	925
7.09	6.00	5.09	5.00	1.70	Made from white corn,	As certified,	553
7.53	6.00	4.33	5.00	34.00	Made from white corn,	As certified,	209
8.43	6.00	5.31	5.00	30.00	Made from white corn,	As certified,	51
9.63	6.00	5.13	5.00	33.00	Made from pure white corn.	As certified,	560
8.13	.....	5.23	.....	33.00			
7.80	5-8	3.30	3-5	1.85	.....	Hominy feed,	1033
7.19	5-8	4.66	3-5	1.80	.....	Hominy feed,	1074
7.50	.....	3.98	.....	1.33			
7.59	6.50	4.98	5.00	34.00	.....	Hominy feed,	538
7.60	6.50	4.71	5.00	1.85	.....	Hominy feed,	1068
7.60	.....	4.32	.....	35.50			
7.08	6.00	5.61	5.00	31.00	Made from pure white corn.	As certified,	820
7.10	6.00	5.64	5.00	1.75	Made from pure white corn.	As certified,	320
7.10	.....	5.62	.....	23.00			
9.30	4.00	3.35	4.00	2.00	Yellow hominy feed, ..	As certified,	359
9.45	4.00	2.90	4.00	1.85	Yellow hominy feed, ..	As certified,	904
8.70	4.00	2.92	4.00	1.80	Yellow hominy feed, ..	As certified,	1176
8.26	4.00	3.18	4.00	1.90	Yellow hominy feed, ..	As certified,	179
8.68	.....	3.06	.....	1.89			
9.23	7.00	5.24	6.00	1.50	.....	Hominy feed,	60
6.04	7.00	3.32	6.00	1.60	... ..	Hominy feed,	231
8.94	.....	4.53	.....	1.55			
9.34	7.1-9	4.77	10.00	1.65	Compounded from white corn.	As certified,	223

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
541	Acme, Suffern-Hunt Mills, Decatur, Ill.	Bird-In-hand, J. A. Umblo & Bro.	541	Per ct. 8.68	Per ct. 12.31	Per ct. 9.3-11
		Average,		9.67	11.91	.....
550	..... O. W. Wagar Co., Philadelphia, Pa.	Rouks, E. D. Leaman, ..	550	9.90	12.50	.....
		Total average,		9.88	11.74	.....
	Corn Bran.					
1025	..... Miner-Hillard Milling Co., Wilkes-Barre, Pa.	Wilkes-Barre, Miner-Hillard Milling Co.	1025	10.56	9.54	10
1140	Malzeline Feed, C. W. Wagar & Co., Philadelphia, Pa.	West Chester, E. D. Hemphill.	1140	7.90	10.13	7.00
1139	White, Walters Milling Co., Philadelphia, Pa.	Downingtown, H. O. Clarkson.	1139	8.76	10.56	8-12
		Average,		9.07	10.08	.....
	Corn Feed Meal.					
1253	..... Fal play Feed Mills, Linton, Ind.	Hays, John Lachman & Co.	1253	13.04	9.50	7.00
	WHEAT OFFALS.					
	Low Grade Flour.					
623	Red Dog, Duluth Superior Milling Co., Duluth, Minn.	DuBois, A. T. Sprankle. .	623	10.13	18.06	17.00
1240	Foundry, B. A. Eckhart Milling Co., Chicago, Ill.	Wesleyville, W. D. Ripley	1240	11.72	15.44	.....
		Average,		10.92	16.75	.....
	Wheat Middlings.					
735	..... Blank & Gottshall, Sunbury, Pa.	Jersey Shore, W. N. Brosna.	735	11.62	16.69	14-16
734	White, Blank & Gottshall, Sunbury, Pa.	Jersey Shore, W. N. Brosna.	734	11.09	16.31	14-16
1158	Matchless Wheat Standard, L. Christian & Co., Minneapolis, Minn.	Derry, L. A. Wheeler, ...	1158	13.30	16.25	15.50
854	..... City Flouring Mills, Inc., Muncy, Pa.	Phillipsburg J. O. Reed, .	854	11.25	15.25	14.44
702	..... Colby Milling Co., Dowagiac, Mich.	Miffin, W. H. Manbeck & Co.	702	11.23	14.50	.....
773	..... Crouch Brothers Co., Erie, Pa.	Titusville, Titusville City Mills.	773	11.25	16.38	14.00
789	Soft White, Globe Elevator Co., Buffalo, N. Y.	Lindsey, Lindsey Milling Co.	789	10.63	13.00	12-15
106	Hoffer's Pure, John Hoffer Flouring Mills Co., Steelton.	Harrisburg, Mock & Hartman.	106	10.21	16.44	14.00
193	Fresh Ground, G. B. Hoover, Woodbury, Pa.	Everett, A. H. Whetstone	193	12.47	14.81	5-10
911	Standard Wheat Shorts, The Larabee Flour Mills Co., Hutchinson, Kans.	Butler, B. F. Shannon & Co.	911	11.36	19.81	17.00
1194	Standard Wheat Shorts, The Larabee Flour Mills Co., Hutchinson, Kans.	Indiana, St. Clair, Rinn & Co.	1194	10.52	20.25	17.00
843	Pure Wheat Shorts, Maney Milling Co., Omaha, Nebr.	Lewisburg, E. C. Noll. .	843	11.31	13.63	16.00
596	..... R. S. McCague, Pittsburgh, Pa.	New Kensington, A. H. Klugh.	596	11.19	16.38	.....
427	Wheat Shorts, The Monarch Milling Co., Hutchinson, Kans.	Westfield, Frank A. Ackley.	427	11.10	19.50	16.48

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 9.92	Per ct. 7.1-9	Per ct. 5.37	Per ct. 10.00	Per ct. 30.50	Compounded from white corn.	As certified,	541
9.63	.....	5.97	.....	31.75	.....	.....	.....
9.64	.....	3.30	.....	31.50	.....	Hominy feed,	550
8.49	.....	4.58	.....	34.00	.....	.....	.....
4.40	4-7	9.35	8-11	1.30	.....	Corn bran,	1025
3.19	4.00	3.14	13.60	35.00	Pure corn product made from corn bran.	Corn bran and a small amount of corn siftings.	1140
6.47	4-7	5.78	6-10	1.75	.....	Corn bran,	1139
6.36	.....	7.75	.....	33.33	.....	.....	.....
4.25	2.50	1.85	5.00	1.85	Corn feed m.	As certified,	1253
5.34	4.50	3.56	4.00	2.00	.....	Low-grade flour,	628
3.63	.....	1.89	.....	1.80	.....	Low-grade flour,	1240
4.49	.....	2.72	.....	1.80	.....	.....	.....
5.16	4.5-5	5.90	4-4.5	1.70	.....	Wheat middlings and trace of ground screenings.	735
4.25	4.5-5	5.03	4-4.5	1.80	.....	Wheat middlings and small amount of ground screenings.	734
5.45	4.65	6.33	6.40	28.00	.....	Wheat middlings and small amount of ground screenings.	1159
4.14	3.56	4.56	4.32	1.80	.....	Wheat middlings,	354
4.30	.....	3.31	.....	1.80	.....	Wheat middlings,	703
5.28	4.50	5.57	3.12	1.60	.....	Wheat middlings,	773
5.17	3-5	4.96	4-5	1.75	.....	Wheat middlings,	789
4.42	3.00	3.76	9.00	1.75	.....	Wheat m'iddlings,	106
5.14	2-5	3.22	10-15	1.90	.....	Wheat middlings and small amount of ground screenings.	193
5.29	4.50	4.65	5.50	1.75	.....	Wheat middlings,	911
6.56	4.50	4.86	5.50	32.00	.....	Wheat middlings, ...	1194
4.69	5.00	5.02	5.50	32.00	.....	Wheat middlings, ..	343
4.50	.....	4.53	.....	1.85	.....	Wheat middlings,	596
4.82	4.07	4.59	8.00	1.75	.....	Wheat middlings,	427

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
387	Hardenbergh's Fancy White, National Milling Co., Minneapolis, Minn.	Clearfield, John W. Hberts	387	Per ct. 10.40	Per ct. 17.25	Per ct. 16.70
623	Standard, New Prague Flouring Mills Co., New Prague, Minn.	Oil City, Magee Feed Co.	623	10.96	18.00	17.75
363	White Flour, Northwestern Milling Co., Little Falls, Minn.	Clearfield, John W. Smith & Bro.	363	11.30	16.69	15.00
391	..... Osakis Milling Co., Osakis, Minn.	Smethport, Herzog Milling Co.	391	11.03	17.63	16.00
659	..... Pennock & Brosins, Avondale, Pa.	Leaman Place, Harry K Hershey.	659	10.90	16.44	.....
183	..... The Quaker Oats Co., Chicago, Ill.	Bedford, Davidson Bros.,	183	11.97	19.33	.....
1192	..... George L. Reed Milling Co., Brookville, Pa.	Brookville, George L. Reed Milling Co.	1192	11.43	17.04	.....
19	..... P. A. & S. Small Co., York, Pa.	York, P. A. & S. Small Co.	19	11.95	14.50	.....
1102	Crescent, Star & Crescent Milling Co., Chicago, Ill.	Jeannette, Keystone Supply Co.	1102	12.40	17.13	16.00
24	..... F. W. Stock & Sons, Hillsdale, Mich.	York, Strayer Bros. Co.,	24	9.87	17.19	16.50
982	Pure Wheat Flour, Tennant & Hoyt Co., Lake City, Minn.	Mt. Union, David Rummel	982	11.87	18.19	16.00
652	Z-Pure Wheat Shorts, Zenith Milling Co., Kansas City, Mo.	Ridgway, Smith Bros. Co.	652	9.92	19.56	16.00
	Wheat Middlings with Admixtures.	Average, .....	.....	11.23	17.24	.....
951	Gem Middlings, T. M. Biddle, Altoona, Pa.	Altoona, T. M. Biddle, ..	951	10.66	14.33	10.10
948	Gem Middlings, T. M. Biddle, Altoona, Pa.	Junlata, R. I. Remaley, .	948	10.15	15.91	10.01
		Average, .....	.....	10.40	15.15	.....
197	Big Diamond Wheat Flour Middlings with Screenings not Exceeding Mill Run, Big Diamond Mill Co., Minneapolis, Minn.	Saxton, Stapleton & McClain.	197	11.34	13.69	14.50
1070	Special Middlings, Brown & Fassett, Tunkhannock, Pa.	Montrose, Brown & Fassett.	1070	10.80	14.25	12-16
1116	Berkshire Wheat Flour Middlings with Ground Screenings not exceeding Mill Run, George C. Christian, Minneapolis, Minn.	Belle Vernon, C. N. Luce.	1116	9.56	16.00	14.00
300	Poland Wheat Standard Middlings with Ground Screenings not exceeding Mill Run, George C. Christian, Minneapolis, Minn.	McKeesport, Keystone Commercial Co.	300	10.63	16.63	14.50
283	Poland Wheat Standard Middlings with Ground Screenings not exceeding Mill Run, George C. Christian, Minneapolis, Minn.	Latrobe, Latrobe Feed & Supply Co.	283	10.12	17.25	14.00
		Average, .....	.....	10.40	16.94	.....
52	Palm Oil Middlings, City Roller Mills, New Castle, Pa.	Elizabethtown, Lehman & Wolgemuth.	52	5.16	18.44	15.00
861	Refuse Cleaning Mixture, City Roller Mills, New Castle, Pa.	New Castle, City Roller Mills.	861	4.13	16.94	14.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 5.07	Per ct. 4.30	Per ct. 5.29	Per ct. 9.20	Per ct. 1.80	.....	Wheat middlings and trace of ground screenings.	267
5.94	5.30	6.55	6.75	1.60	.....	Wheat middlings and trace of ground screenings.	623
5.26	4.50	7.60	8.30	1.75	.....	Wheat middlings and small amount of ground screenings.	363
6.01	4.00	6.51	14.00	1.65	.....	Wheat middlings,	391
4.98	.....	4.77	.....	1.90	.....	Wheat middlings and trace of ground screenings.	559
4.60	.....	3.85	.....	1.80	.....	Wheat middlings,	183
4.75	.....	4.68	.....	1.60	.....	Wheat middlings,	1192
4.29	.....	4.70	.....	1.75	.....	Wheat middlings and trace of ground screenings.	18
4.05	4.00	3.53	6.00	36.00	.....	Wheat middlings,	1102
4.83	4.00	6.84	6.00	24.00	Made from pure wheat	As certified,	24
5.25	4.90	5.73	5.10	2.00	.....	Wheat middlings,	982
5.70	3.50	6.77	9.00	2.00	.....	Wheat middlings,	652
4.98	.....	5.15	.....	34.92	.....	.....	.....
6.05	2.10	3.54	11.30	35.00	Wheat middlings and hominy feed.	As certified,	851
7.80	2.10	4.89	11.30	1.90	Wheat middlings, red dog flour and hominy feed.	As certified,	943
6.68	.....	4.21	.....	36.50	.....	.....	.....
5.44	4.50	5.19	7.76	1.90	.....	Wheat middlings and mill run ground screenings.	197
6.69	5-10	6.37	4-6	1.70	Wheat middlings and hominy.	As certified,	1070
5.72	4.00	6.46	8.00	1.80	.....	Wheat middlings and mill run ground screenings.	1116
5.33	4.00	3.61	9.50	1.65	.....	Wheat middlings and mill run ground screenings.	300
5.63	4.00	3.19	9.50	1.60	.....	Wheat middlings and mill run ground screenings.	283
5.53	.....	3.35	.....	1.63	.....	.....	.....
3.95	6.00	5.65	7.50	17.00	Wheat middlings and palm oil.	As certified,	52
7.01	4.50	7.39	3.77	1.25	Wheat middlings 75% rye middlings 25% and palm oil.	As certified, ...	861

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Grade Protein.	
					Found.	Guaranteed.
1196	Claro Wheat Middlings, Claro Milling Co., Lakeville, Minn.	Indiana, St. Clair, Rinn & Co.	1196	Per ct. 10.51	Per ct. 17.69	Per ct. 15.00
1186	Choice White Middlings, The Cleveland Milling Co., Cleveland, Ohio.	Brookville, Kline's Sifter Mills.	1186	10.66	15.94	14-17
1187	Special Fine Middlings, The Cleveland Milling Co., Cleveland, Ohio.	Brookville, Kline's Sifter Mills.	1187	10.85	15.12	15-18
732	Crescent Standard Middlings with Ground Screenings not exceeding Mill Run, Crescent Milling Co., Fairfax, Minn.	Lock Haven, F. H. Dyer,	732	9.78	16.63	16.20
620	White Pig Middlings, Duinuth-Superior Milling Co., Duinuth, Minn.	Oil City, New Model Milling Co.	620	10.63	16.09	16.50
1225	Middlings with Ground Screenings not exceeding Mill Run, R. A. Eckhart Milling Co., Chicago, Ill.	Linesville, Linesville Coal, Lime & Cement Co.	1225	10.88	16.90	14.00
39	Snowball Wheat White Middlings with Ground Screenings not exceeding Mill Run, The Gardner Mills, Hastings, Minn.	Hanover, George Hull & Sons.	39	11.50	17.19	15.00
172	Harter's Winter Wheat Middlings with Ground Screenings not exceeding Mill Run, The Harter Milling Co., Toledo, Ohio.	Windber, Weaver & Berkey.	172	10.62	16.63	15.00
170	White middlings and screenings, The Kaw Milling Co., Topeka, Kans.	Windber, Claude Davis, ..	170	10.41	13.47	13.00
399	Badger Fancy Middlings, Charles A. Krause Milling Co., Milwaukee, Wis.	Emporium, Emporium Milling Co.	399	10.00	12.50	12.00
552	Badger Fancy Middlings, Charles A. Krause Milling Co., Milwaukee, Wis.	Ronks, E. D. Leaman,	552	8.85	12.56	12.00
286	Badger Fancy Middlings, Charles A. Krause Milling Co., Milwaukee, Wis.	Greensburg, McFarland Supply Co.	286	10.30	12.50	12.00
1012	Badger Fancy Middlings, Charles A. Krause Milling Co., Milwaukee, Wis.	Washington, H. G. Miller,	1012	10.05	12.56	12.00
		Average, ....	.....	9.80	13.28	.....
128	Wheat Shorts with Mill Run Screenings, not to exceed 8 per cent, The Larabee Flour Mills Co., Hutchinson, Kans.	Carrolltown, W. A. Fek-enrode.	128	11.32	19.75	16.00
1206	Elmco Wheat Standard Middlings and Screenings, Listman Mill Co., La Crosse, Wis.	Blairsville, J. A. McKelvey.	1206	9.97	18.00	18.18
717	Elmco Wheat Fancy White Middlings and Screenings, Listman Mill Co., La Crosse, Wis.	Port Royal, Port Royal Grain Elevator.	717	10.21	17.56	15.00
382	Fancy Canadian Middlings with Ground Screenings not exceeding Mill Run, Maple Leaf Milling Co. Ltd., Toronto, Canada.	Bradford Smith Brothers,	382	9.62	19.00	16.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 6.17	Per ct. 8.00	Per ct. 7.07	Per ct. 10.00	Per ct. 1.50	Standard and flour middlings, red dog and ground screenings not exceeding mill run.	As certified,	1196
4.84	4.4	4.69	8.00	1.65	Made from wheat with ground screenings not exceeding mill run.	As certified,	1186
4.32	5.4	8.12	6.00	1.75	Made from wheat with ground screenings not exceeding mill run.	As certified,	1187
5.23	5.90	10.37	10.00	1.50	.....	Wheat middlings and large amount of ground screenings.	733
5.22	5.00	7.53	7.00	1.70	Wheat flour middlings with ground screenings not exceeding mill run.	As certified,	620
4.99	4.00	6.79	7.00	27.00	.....	Wheat middlings and mill run ground screenings.	1225
5.45	4.00	6.58	7.50	22.00	.....	Wheat middlings and mill run ground screenings.	39
4.74	4.00	5.55	6.50	1.75	.....	Wheat middlings and mill run ground screenings.	172
4.13	4.40	3.77	6.00	25.00	.....	Wheat middlings and ground screenings.	170
7.48	4.50	4.47	7.00	1.80	Maize red dog flour and wheat middlings with ground screenings not exceeding mill run.	As certified,	299
7.71	4.50	4.22	7.00	23.00	Wheat middlings and maize red dog flour.	As certified,	552
7.05	4.50	3.89	7.00	1.70	Maize red dog flour and wheat middlings with ground screenings not exceeding mill run.	As certified,	286
8.00	4.50	4.64	7.00	1.80	Maize red dog flour and wheat middlings with ground screenings not exceeding mill run.	As certified,	1012
7.58	.....	4.30	.....	24.75	.....	.....	.....
5.23	3.60	4.11	5.50	1.90	.....	Wheat middlings and mill run ground screenings.	126
6.95	5.57	6.68	10.02	1.60	.....	Wheat middlings and ground screenings.	1206
5.21	4.00	5.06	6.00	1.70	.....	Wheat middlings and ground screenings.	717
5.94	5.10	7.23	10.00	22.00	.....	Wheat middlings and mill run ground screenings.	382

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
145	Wheat Shorts with Screenings not exceeding Mill Run, Marshall Milling Co., Marshall, Minn.	Somerset, Saylor & Woy,	145	Per ct. 10.66	Per ct. 16.75	Per ct. 17.00
1079	Colonial Choice Middlings, Miner-Hillard Milling Co., Scranton, Pa.	Scranton, Miner-Hillard Milling Co.	1079	10.36	12.06	12-15
88	Wheat Middlings not exceeding Mill Run with Screenings, National Feed Co., St. Louis, Mo.	Harrisburg, Hoffer & Garman.	88	10.82	19.50	16.00
277	Challenge Fancy Middlings, Newsome Feed and Grain Co., Pittsburgh, Pa.	Greensburg, Hudson & Kuhns.	277	11.22	14.06	12.00
1217	Palm Midds, Newsome Feed and Grain Co., Pittsburgh, Pa.	Linesville, Linesville Milling Co.	1217	4.19	17.69	16.00
1160	Palm Midds, Newsome Feed and Grain Co., Pittsburgh, Pa.	Derry, L. A. Wheeler, ..	1160	7.71	18.44	16.00
		Average,		5.95	12.07	.....
987	Middlings with Ground Screenings not exceeding Mill Run, Rockwell's Flour Mills, North Baltimore, Ohio.	Braddock, John Lachman,	987	12.90	12.21	14.00
1090	Palm Oil Middlings, J. B. Roux, Farrell, Pa.	Farrell, J. B. Roux,	1090	5.42	12.31	15.00
994	Wheat Flour Middlings with Ground Screenings not exceeding Mill Run, Sleepy Eye Flour Mills Co., Minneapolis, Minn.	Washington, C. S. Hunter & Co.	994	11.00	17.44	17.20
1255	Wheat Middlings with Screenings not exceeding Mill Run, Standard Tilton Milling Co., St. Louis, Mo.	Hays, John Lachman & Co.	1255	10.79	17.09	15.00
1213	Wheat Middlings with Ground Screenings not exceeding Mill Run, Tenant & Hoyt Co., Lake City, Minn.	Blairsville, George J. New	1213	10.28	16.12	16.00
302	Camp's No. 2, White Middlings and Corn Meal, The Toledo Grain & Milling Co., Toledo, Ohio.	Mt. Pleasant, J. H. Brown & Son.	302	10.40	15.81	12-14
136	Camp's No. 2, White Middlings and Corn Meal, The Toledo Grain & Milling Co., Toledo, Ohio.	South Fork, J. E. Crissman.	136	11.26	16.50	12-14
1210	Camp's No. 2, White Middlings and Corn Meal, The Toledo Grain & Milling Co., Toledo, Ohio.	Blairsville, J. A. McKelvey.	1210	10.26	16.26	12-14
		Average,		10.64	16.19	.....
616	Pure Winter Wheat Middlings with Screenings not to exceed Mill Run, Trenton Milling Co., Trenton, Ill.	Tionesta, Lanson Brothers,	616	10.73	17.19	16.00
369	Wheat Flour Middlings with Ground Screenings not exceeding Mill Run, Washburn Crosby Co., Minneapolis, Minn.	Clearfield, J. T. Murphy, .	369	12.47	18.75	17.00
737	Black Hawk Wheat Standard Middlings with Ground Screenings not exceeding Mill Run, Western Flour Mills Co., Davenport, Iowa.	Jersey Shore, W. N. Brosna	737	10.50	18.00	16.30
850	Mixed Middlings, L. E. Yagel, Millmont, Pa.	Millinburg, R. T. Foster & Son.	850	10.86	15.88	15.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 5.63	Per ct. 5.64	Per ct. 8.19	Per ct. 9.44	Per ct. 1.80	.....	Wheat middlings and mill run ground screenings.	146
6.81	5-8	6'00	6-8	1.75	Wheat middlings including mill run screenings and white corn middlings. Made from wheat.	As certified,	1079
4.81	4.00	5.58	7.00	23.00	.....	Wheat middlings and mill run ground screenings.	88
6.71	4.50	4.35	7.00	23.00	Maize red dog flour and wheat middlings with ground screenings not exceeding mill run.	Maize red dog flour, rye middlings, wheat middlings and mill run ground screenings.	277
9.12	6.00	5.61	7.00	1.85	Cleaning middlings and palm oil.	As certified,	1217
7.66	6.00	7.06	7.00	1.50	Cleaning middlings and palm oil.	As certified,	1190
8.29	.....	6.24	.....	1.43	.....	.....	.....
2.75	4.80	3.44	12.00	1.70	.....	Wheat middlings, mill run ground screenings and trace of whole weed seeds.	967
8.63	6.00	6.23	7.50	1.30	Wheat middlings and palm oil.	Wheat middlings, rye middlings and palm oil.	1090
5.22	4.20	6.08	7.70	1.90	.....	Wheat middlings, and mill run ground screenings.	994
4.70	4.00	4.59	6.00	1.55	.....	Wheat middlings, and mill run ground screenings.	1258
5.64	5.00	7.52	8.00	1.70	.....	Wheat middlings, and mill run ground screenings.	1213
4.76	4-6	6.45	6.00	1.70	Wheat middlings and fine white corn meal.	Wheat middlings,	302
5.14	4-6	6.22	6.00	23.00	Wheat middlings and fine white corn meal.	Wheat middlings,	128
5.63	4-6	6.46	6.00	1.70	Wheat middlings and fine white corn meal.	Wheat middlings,	1210
5.13	.....	6.41	.....	23.67	.....	.....	.....
4.85	4.00	4.23	7.00	1.85	.....	Wheat middlings and mill run ground screenings.	616
5.26	5.00	5.56	6.50	1.80	.....	Wheat middlings and mill run ground screenings.	369
6.00	5.70	7.15	6.50	1.70	.....	Wheat middlings and mill run ground screenings.	737
4.57	3.00	5.53	4.80	1.70	Wheat and screenings.	Wheat middlings and ground screenings.	850

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.		
					Found.	Guaranteed.	
	Mixed Feed—Wheat By-Products.			Per ct.	Per ct.	Per ct.	
453	Mixed Boston Feed, Duluth—Superior Milling Co., Duluth, Minn.	Mansfield, Sun Milling Co.	453	8.88	16.31	16.50	
591	Standard Wheat Feed with Ground Screenings not exceeding Mill Run, Huron Milling Co., Huron, S. Dak.	Parnassus, Johnston & Hamilton.	591	11.53	16.69	16.00	
196	Matchless Heavy Mixed Feed, Hunter-Robinson-Wenz Milling Co., St. Louis, Mo.	Saxton, Stapleton & McClain.	196	10.96	17.31	15.50	
279	Winter Sunshine Mixed Feed, Hunter-Robinson-Wenz Milling Co., St. Louis, Mo.	Greensburg, Hudson & Kuhns.	279	10.17	18.88	14.50	
77	Mill Run Wheat Feed, Levan & Sons, Columbia, Pa.	Lancaster, Levan & Sons,	77	11.36	15.38	.....
501	Mixed Feed, The Osakis Milling Co., Osakis, Minn.	Rochester, Rochester Seed & Supply Co.	501	9.27	16.06	15.00	
1072	Occident Wheat Feed, Russell-Miller Milling Co., Minneapolis, Minn.	Montrose, Brown & Fasset.	1072	11.19	18.56	15.00	
196	Mixed Wheat Feed, Stapleton & McClain, Saxton, Pa.	Saxton, Stapleton & McClain.	196	11.59	15.94	.....
412	Monarch Fancy Wheat Feed, F. W. Stock & Sons, Hillsdale, Mich.	Coudersport, Eulalia Mills,	412	10.59	16.81	16.00	
1223	Kent Mixed Feed, The Williams Brothers Co., Kent, Ohio.	Wealeyville, W. D. Ripley.	1223	10.53	15.63	12-19	
	Wheat Bran.	Average, .....	.....	10.60	16.76	.....
1106	Mulac Fancy, Aberdeen Milling Co., Aberdeen, S. Dak.	Jeannette, Keystone Supply Co.	1106	10.28	15.69	14.00	
829	..... The D. G. Bamford Milling Co., Midway, Pa.	Midway, The D. G. Bamford Milling Co.	829	11.38	17.00	.....
848	..... Buffalo Flour Milling Co., Lewisburg, Pa.	Lewisburg, Buffalo Flour Milling Co.	848	10.31	15.75	.....
1220	..... Alex. S. Campbell, Austin, Minn.	Linesville, Linesville Milling Co.	1220	8.93	14.81	14.00	
1184	Pure, George C. Christian, Minneapolis, Minn.	Brookville, Kline's Sifter Mills	1184	8.67	15.00	13.00	
896	..... Crouch Brothers Co., Erie, Pa.	Smethport, F. A. Greene,	896	9.38	16.00	15.00	
203	Pure, E. E. Delp Grain Co., Bourbon, Ind.	Huntingdon, Huntingdon Milling Co.	203	10.58	16.88	.....
741	Pure, Gamble, Gheen & Co., Bellefonte, Pa.	Antes Fort, Gheen, Spiegelmyer & Phieger.	741	10.52	14.44	.....
16	..... Grafton Roller Mills Co., Grafton, N. Dak.	York, P. A. & S. Small Co.	16	11.48	15.88	15.90	
625	..... Hetrick, Wilson & Co., Indiana, Pa.	Indiana, Hetrick, Wilson & Co.	625	11.63	16.00	.....
34	..... John Hoffer Flouring Mill Co., Steelton, Pa.	Littlestown, D. E. Bucky & Son.	34	10.25	15.12	.....
969	Palace, Kehler Flour Mills Co., St. Louis, Mo.	Altoona, R. F. Notley, ..	969	10.31	17.94	14.50	
771	..... Kerr Hill Mill Co., Ltd., Titusville, Pa.	Titusville, Kerr Hill Mill Co., Ltd.	771	10.76	15.63	.....
79	..... Levan & Sons, Columbia, Pa.	Lancaster, Levan & Sons,	79	10.88	14.26	.....
1043	Pure, Mauser Mill Co., Laurys Station, Pa.	Hazleton, Mauser Mill Co.	1043	11.66	15.44	14.00	

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct.	Per ct.	Per ct.	Per ct.	Per ct.			
5.44	4.50	9.74	9.5	43.00	Wheat bran, middlings, low grade flour with ground screenings not exceeding mill run.	As certified,	433
5.06	5.00	4.25	6.00	35.00	.....	Wheat bran, wheat middlings and mill run ground screenings.	591
5.03	4.00	8.52	10.00	1.70	Wheat bran and middlings with ground screenings not exceeding mill run.	As certified,	196
4.58	4.00	7.97	8.00	30.00	Wheat bran, middlings and ground screenings not exceeding mill run.	As certified,	279
4.60	.....	7.25	.....	28.00	.....	Wheat bran, wheat middlings and trace of ground screenings.	77
5.61	4.00	8.98	14.00	1.55	.....	Wheat bran and wheat middlings.	501
5.79	4.00	7.22	10.00	1.60	Made from wheat only.	Wheat bran, and wheat middlings.	1072
4.23	.....	6.56	.....	1.70	.....	Wheat bran, wheat middlings and trace of ground screenings.	196
5.07	4.00	8.27	10.00	1.65	Wheat feed with mill run screenings.	Wheat bran, wheat middlings and mill run ground screenings.	412
4.67	2-9	6.04	9-15	1.50	.....	Wheat bran and wheat middlings.	1223
5.02	.....	7.53	.....	32.00	.....	.....	.....
5.18	4.40	9.63	10.70	28.00	.....	Wheat bran,	1105
5.56	.....	8.30	.....	29.00	.....	Wheat bran and small amount of ground screenings.	329
5.08	.....	10.00	.....	29.00	.....	Wheat bran and large amount of ground screenings.	343
5.09	4.00	10.44	12.00	1.25	.....	Wheat bran and small amount of ground screenings.	1280
4.83	4.00	9.82	10.50	26.00	.....	Wheat bran,	1184
4.80	4.50	9.44	9.50	1.50	.....	Wheat bran and trace of ground screenings.	396
5.45	.....	8.96	.....	32.00	.....	Wheat bran and trace of ground screenings.	303
4.27	.....	9.73	.....	1.60	.....	Wheat bran and trace of ground screenings.	741
5.02	4.00	9.26	11.90	27.00	.....	Wheat bran and trace of ground screenings.	16
5.27	.....	9.99	.....	1.59	.....	Wheat bran and small amount of ground screenings.	635
4.57	.....	8.69	.....	27.00	.....	Wheat bran,	34
4.61	4.00	10.00	10.00	1.75	.....	Wheat bran,	959
4.38	.....	7.95	.....	1.50	.....	Wheat bran,	771
4.23	.....	8.43	.....	27.00	.....	Wheat bran,	79
4.64	5.00	9.54	9.00	1.40	.....	Wheat bran and small amount ground screenings.	1043

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
803	Choice, Niagara Falls Milling Co., Niagara Falls, N. Y.	Reynoldsville, Patton & Daugherty.	803	Per ct. 10.92	Per ct. 16.94	Per ct. 14.00
715	Pure—No Screenings. The Northwestern Consolidated Milling Co., Minneapolis, Minn.	Port Royal, Port Royal Grain Elevator.	715	10.42	15.63	14.50
546	Pure—No Screenings. The Northwestern Consolidated Milling Co., Minneapolis, Minn.	Bird-in-Hand, J. A. Umbles Bros.	546	10.00	15.94	14.50
364	..... Northwestern Milling Co., Little Falls, Minn.	Clearfield, John W. Smith & Bro.	364	11.00	14.44	12.50
1191	..... George L. Reed Milling Co., Brookville, Pa.	Brookville, George L. Reed Milling Co.	1191	8.80	15.22	.....
547	..... Russell-Miller Milling Co., Minneapolis, Minn.	Ronks, E. D. Leaman,...	547	9.79	17.12	13.00
27	Clover Leaf, Shane Brothers & Wilson Co., Arlington, S. Dak.	Hanover, C. E. Miller, ..	27	12.55	15.06	14.00
146	Clover Leaf, Shane Brothers & Wilson Co., Arlington, S. Dak.	Somerset, Saylor & Woy.	146	9.29	15.76	14.00
905	Pure, Sleepy Eye Flour Mills Co., Minneapolis, Minn.	Washington, C. S. Hunter Co.	905	11.19	15.23	14.50
954	..... Unknown,	Altoona, T. M. Eiddle, ..	954	10.01	12.19	.....
401	..... Unknown,	Emporium, Emporium Milling Co.	401	10.14	12.12	.....
263	..... Unknown,	Reading, Isaiah B. Seibert,	263	9.95	17.81	.....
		Average, .....	.....	10.41	16.00	.....
	Wheat Bran With Admixtures.					
499	Wheat Bran with Ground Screenings not exceeding Mill Run, Bernet, Craft & Kauffman Milling Co., St. Louis, Mo.	Rochester, Rochester Seed & Supply Co.	499	9.15	17.50	14.30
975	Big Diamond Wheat Bran with Ground Screenings not exceeding Mill Run. Big Diamond Mills Co., Minneapolis, Minn.	Carlisle, W. S. Stuart, ..	975	9.00	15.56	14.00
734	Pure Wheat Bran with Ground Screenings, Blaine, Mackay, Lee Co., North East, Pa.	Corry, Wales & Spencer,...	734	9.93	16.56	15.40
834	Extra Coarse Wheat Bran with Ground Screenings not exceeding Mill Run, Blake Milling Co. Edwardsville, Ill.	Rutler, H. J. Klingler & Co.	834	11.00	17.50	15.50
920	Wheat Bran with Ground Screenings not exceeding Mill Run, Cannon Valley Milling Co., Minneapolis, Minn.	Canton, Preston Bro...thers.	920	10.32	15.00	16.10
804	Claro Wheat Bran with Ground Screenings not exceeding Mill Run. Claro Milling Co., Lakeville, Minn.	Reynoldsville, Patton & Daugherty.	804	11.15	15.31	14.00
186	Wheat Bran with Ground Screenings not exceeding Mill Run, The Cleveland Milling Co., Cleveland, Ohio.	Bedford, N. M. & O. R. Diehl.	186	9.98	16.56	14-17
1183	Spring Wheat Bran with Ground Screenings not exceeding Mill Run, The Cleveland Milling Co., Cleveland, Ohio.	Brookville, Kline's Sifter Mills.	1183	8.10	15.06	14-17

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct.	Per ct.	Per ct.	Per ct.	Per ct.			
5.53	3.00	9.37	13.00	1.45	.....	Wheat bran,	803
4.88	4.00	10.73	11.00	1.60	.....	Wheat bran,	715
5.00	4.00	10.02	11.00	28.00	.....	Wheat bran and trace of chaff and ground screenings.	546
5.31	2.90	10.42	13.30	1.60	.....	Wheat bran and trace of ground screenings.	384
4.79	.....	10.28	.....	1.40	.....	Wheat bran and small amount of ground screenings.	1191
5.30	4.00	9.46	11.00	23.50	Made from wheat only.	Wheat bran and trace of chaff and ground screenings.	547
4.92	3.70	9.31	13.50	27.00	.....	Wheat bran,	27
5.30	3.70	9.66	12.50	1.60	.....	Wheat bran and trace of ground screenings.	146
5.08	4.30	10.42	10.50	1.50	.....	Wheat bran and small amount of ground screenings.	996
4.86	.....	9.25	.....	29.00	.....	Wheat bran,	954
4.73	.....	9.35	.....	1.65	.....	Wheat bran,	401
4.83	.....	9.21	.....	1.50	.....	Wheat bran,	263
4.96	.....	9.53	.....	29.30	.....	
4.30	3.55	9.62	.....	1.45	.....	Wheat bran and mill run ground screenings.	499
5.08	4.00	11.15	11.07	28.00	.....	Wheat bran and mill run ground screenings.	275
5.15	4.00	8.53	10.00	1.40	.....	Wheat bran and ground screenings.	734
4.66	4.00	10.03	11.00	1.45	.....	Wheat bran and mill run ground screenings.	834
4.64	4.00	10.39	14.60	1.30	.....	Wheat bran and mill run ground screenings.	920
5.69	3.00	10.50	12.00	1.45	.....	Wheat bran and large amount ground screenings.	804
4.72	4.5-6.5	10.18	13.00	1.45	.....	Wheat bran and mill run ground screenings.	186
5.38	4.5-6.5	9.13	12.00	26.00	.....	Wheat bran and mill run ground screenings.	1183

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
1108	Spring Wheat Bran with Ground Screenings not exceeding Mill Run, The Cleveland Milling Co., Cleveland, Ohio.	Charleroi, R. O. Mountser,	1108	Per ct. 10.06	Per ct. 14.17	Per ct. 14-17
		Average,		9.07	14.00	.....
731	Wheat Bran with Ground Screenings not exceeding Mill Run, Crescent Milling Co., Fairfax, Minn.	Lock Haven, F. H. Dyer,	731	10.13	16.13	14.20
384	Wheat Bran with Ground Screenings not exceeding Mill Run, William G. Crocker, Minneapolis, Minn.	Bradford, Smith Brothers,	384	9.73	16.50	14.50
396	Wheat Bran with Ground Screenings not exceeding Mill Run, Crouch Brothers Co., Erie, Pa.	Butler, P. J. Oesterling & Son.	396	11.26	17.06	15.00
774	Wheat Bran with Ground Screenings not exceeding Mill Run, Crouch Brothers Co., Erie, Pa.	Titusville, Titusville City Mills.	774	10.47	16.56	15.00
		Average,		10.36	16.31	.....
107	Duluth Imperial Bran, Duluth Superior Milling Co., Duluth, Minn.	Harrisburg, Mock & Hartman.	107	10.12	15.63	15.00
89	Wheat Bran With Ground Screenings not exceeding Mill Run, Duluth Universal Milling Co., Duluth, Minn.	Harrisburg, Hoffer & Garman.	89	10.33	15.33	14.00
115	Wheat Bran with Ground Screenings not exceeding Mill Run, Eagle Roller Mill Co., New Ulm, Minn.	Johnstown, Swope Brothers.	115	10.41	15.31	15.45
163	Bran with Ground Screenings not exceeding Mill Run, B. A. Eckhart Milling Co., Chicago, Ill.	Somerset, H. C. Beerits' Sons.	163	9.96	16.63	14.00
269	Bran with Ground Screenings not exceeding Mill Run, B. A. Eckhart Milling Co., Chicago, Ill.	Mt. Penn, Nein Brothers,	269	10.35	16.75	14.00
1239	Bran with Ground Screenings not exceeding Mill Run, B. A. Eckhart Milling Co., Chicago, Ill.	Wesleyville, W. D. Ripley.	1239	11.63	15.44	14.00
1064	Bran with Ground Screenings not exceeding Mill Run, B. A. Eckhart Milling Co., Chicago, Ill.	Luzerne, H. N. Schooley & Son.	1064	10.79	16.00	14.00
		Average,		10.65	16.21	.....
429	Choice Wheat Bran with trace of Screenings, Hecker-Jones-Jewell Milling Co., Buffalo, N. Y.	Westfield, Frank A. Ackley.	429	9.35	15.00	15.75
215	Wheat Bran with Mill Run Screenings, The Kansas Milling Co., Wichita, Kans.	Palmyra, J. H. Kettering & Son.	215	10.34	18.25	15.50
167	Wheat Bran and Screenings not to exceed 3 per cent. Screenings, The Kaw Milling Co., Topeka, Kans.	Windber, Claude Davis, ..	167	10.23	18.13	17.00
38	Anchor Bran with Ground Screenings not exceeding Mill Run, Kemper Mill & Elevator Co., Kansas City, Mo.	Manheim, Lancaster County Farmers' Association.	38	10.23	17.19	14.50
647	Anchor Bran, Kemper Mill & Elevator Co., Kansas City, Mo.	St. Marys, Leonard Ritter.	647	11.70	17.63	14.50

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.62	Per ct. 4.5-6.5	Per ct. 10.34	Per ct. 12.00	Per ct. 1.40	.....	Wheat bran and mill ground screen- ings.	1108
5.00	.....	10.01	.....	27.00	.....	.....	.....
4.91	5.10	9.84	12.20	1.50	.....	Wheat bran and mill run ground screen- ings.	731
5.12	4.00	10.42	12.00	1.55	.....	Wheat bran and mill run ground screen- ings.	264
5.42	5.00	9.12	9.00	1.45	.....	Wheat bran and mill run ground screen- ings.	896
5.41	5.00	7.98	9.00	1.40	.....	Wheat bran and mill run ground screen- ings.	774
5.42	.....	8.53	.....	1.43	.....	.....	.....
5.00	4.00	9.94	11.25	1.45	Wheat bran with ground screenings not exceeding mill run.	As certified,	107
5.17	4.00	10.16	12.30	28.00	.....	Wheat bran and mill run ground screen- ings.	89
4.90	3.42	9.78	11.50	30.00	.....	Wheat bran and mill run ground screen- ings.	115
4.42	4.00	8.44	11.00	1.50	.....	Wheat bran and exces- sive amount ground screenings.	163
4.29	4.00	8.55	11.00	1.45	.....	Wheat bran and mill run ground screen- ings.	269
4.79	4.00	9.99	11.00	1.40	.....	Wheat bran, mill run ground screenings and trace whole small weed seeds.	1239
4.56	4.00	9.31	11.00	1.45	.....	Wheat bran and mill run ground screen- ings.	1064
4.59	.....	9.07	.....	29.00	.....	.....	.....
5.12	3.95	10.37	10.36	1.50	Made from pure wheat.	Wheat bran and small amount ground screen- ings.	429
5.00	3.50	8.99	8.50	28.00	Wheat bran with mill run screenings and not to exceed 8 per cent.	As certified,	215
4.55	4.00	8.28	9.60	30.00	.....	Wheat bran and ground screenings.	167
4.63	4.00	9.32	10.00	26.00	Bran and ground wheat screenings.	As certified,	83
4.55	4.00	9.53	10.00	1.60	Bran and ground screenings.	As certified,	647

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
651	Anchor Bran, Kemper Mill & Elevator Co., Kansas City, Mo.	Ridgway, Smith Brothers,	651	Per ct. 10.36	Per ct. 16.56	Per ct. 14.50
		Average,		10.76	17.13	.....
941	Badger Fancy Mixed Feed, Charles A. Krause Milling Co., Milwaukee, Wis.	Troy, H. M. Spalding & Son.	941	*10.32	*13.88	12.50
129	Wheat Bran with Mill Run, Screenings not to exceed 8 per cent., The Larabee Flour Mills Co., Hutchinson, Kans.	Carrolltown, W. A. Eck-enrode.	129	10.88	17.19	14.50
910	Wheat Bran with Mill Run Screenings not to exceed 8 per cent., The Larabee Flour Mills Co., Hutchinson, Kans.	Butler, B. F. Shannon & Co.	910	10.76	17.13	15.00
1197	Wheat Bran with Mill Run Screenings not to exceed 8 per cent., The Larabee Flour Mills Co., Hutchinson, Kans.	Indiana, St. Clair, Rinn & Co.	1197	11.54	16.81	15.00
		Average,		11.05	17.04	.....
96	Wheat Bran with Ground Screenings not exceeding Mill Run, Maney Milling Co., Omaha, Nebr.	Middletown, Brinser Milling and Feed Co.	96	9.94	15.75	14.00
970	Wheat Bran with Ground Screenings not exceeding Mill Run, Maney Milling Co., Omaha, Nebr.	Carlisle, Frank E. Thompson.	970	9.56	16.44	14.00
		Average,		9.75	16.10	.....
1001	Wheat Bran and Screenings, The New Era Milling Co., Arkansas City, Kans.	Houston, W. M. Templeton & Son.	1001	10.82	17.19	14.70
1230	Seal of Minnesota Wheat Bran with Ground Screenings not exceeding Mill Run, New Prague Flouring Mill Co., New Prague, Minn.	Eric, A. P. Allen,	1230	8.92	15.13	13.10
558	Seal of Minnesota Wheat Bran with Ground Screenings not exceeding Mill Run New Prague Flouring Mill Co., New Prague, Minn.	Leaman Place, Harry K. Hershey.	558	9.22	15.63	14.00
622	Wheat Bran with Ground Screenings not exceeding Mill Run, New Prague Flouring Mill Co., New Prague, Minn.	Oil City, Magee Feed Co.,	622	10.04	15.75	14.00
		Average,		9.39	15.50	.....
818	Challenge Fancy Mixed Feed, Newsome Feed & Grain Co., Pittsburgh, Pa.	Carnegie, Carnegie Feed & Supply Co.	818	*10.34	*14.56	12.50
479	Wheat Bran with Ground Screenings, not exceeding Mill Run, Pillsbury Flour Mills Co., Minneapolis, Minn.	Beaver Falls, Dodds & Garrett.	479	10.65	15.94	14.50
1098	Wheat Bran with Screenings not exceeding Mill Run, Geo P. Plant Milling Co., St. Louis, Mo.	Sharon, J. M. Porter, ..	1098	10.85	17.94	15.00
986	Rockwell's Wheat Bran with Ground Screenings not exceeding Mill Run, Rockwell's Flour Mills, North Baltimore, Ohio.	Braddock, John Lachman,	986	12.22	14.00	.....
828	Wheat Bran with Ground Screenings not exceeding Mill Run, Southwestern Milling Co., Kansas City, Mo.	Uniontown, King Brothers,	828	11.20	13.31	16.16

*Excluded from total average.

FEEDING STUFFS COLLECTED IN 1915.--Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.70	Per ct. 4.00	Per ct. 9.93	Per ct. 10.00	Per ct. 1.70	Bran and ground wheat screenings.	As certified,	651
4.63	.....	9.59	.....	30.67			
*7.72	4.00	*4.51	9.00	*1.67	Maize red dog flour and wheat bran with ground screenings not exceeding mill run.	As certified,	941
4.57	3.50	9.06	10.00	1.60	.....	Wheat bran and ground screenings.	129
4.53	3.50	9.16	10.50	1.40	.....	Wheat bran and ground screenings.	910
3.77	3.50	8.67	10.50	26.00	.....	Wheat bran and ground screenings.	1197
4.29	.....	8.96	.....	28.67			
4.71	4.00	10.02	11.00	1.40	.....	Wheat bran and mill run ground screenings.	96
4.92	4.25	10.20	10.50	1.45	.....	Wheat bran and mill run ground screenings.	970
4.83	.....	10.11	.....	1.43			
5.15	4.45	8.47	10.00	23.00	.....	Wheat bran and ground screenings.	1001
5.25	4.50	10.64	10.50	1.20	.....	Wheat bran and mill run ground screenings.	1230
5.13	4.75	10.22	11.00	1.50	.....	Wheat bran and mill run ground screenings.	553
5.00	4.75	10.01	11.00	1.50	.....	Wheat bran and mill run ground screenings.	622
5.14	.....	10.22	.....	1.40			
*7.86	4.00	*5.36	9.00	*1.75	Maize red dog flour and wheat bran with ground screenings not exceeding mill run.	As certified,	818
5.50	4.00	11.54	12.00	1.50	.....	Wheat bran and mill run ground screenings.	479
4.24	3.00	8.72	11.00	1.50	.....	Wheat bran and mill run ground screenings.	1093
4.43	.....	8.50	.....	1.50	.....	Wheat bran and mill run ground screenings.	936
4.65	3.58	8.52	10.22	1.50	.....	Wheat bran and mill run ground screenings.	823

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
564	Wheat Bran with Ground Screenings not exceeding Mill Run, The Southwestern Milling Co., Kansas City, Mo.	Vintage, Paradise Farmers' Association, Inc.	564	Per ct. 10.82	Per ct. 17.88	Per ct. 16.16
	Average,			11.01	18.10	.....
1009	Crescent Winter Wheat Bran with Ground Screenings not exceeding Mill Run, Star & Crescent Milling Co., Chicago, Ill.	Canonsburg, W. H. Dunlap, Jr.	1009	12.28	15.94	15.00
857	Wheat Bran with Ground Screenings not exceeding Mill Run, Tennant & Hoyt Co. Lake City, Minn.	New Castle, New Castle Feed Co.	857	10.95	15.38	14.00
916	Byrite Wheat Bran, George Walter & Sons, Butler, Pa.	Butler, George Walter & Sons.	916	10.97	16.06	12-17
184	Wheat Bran with Ground Screenings not exceeding Mill Run, Washburn-Crosby Co., Minneapolis, Minn.	Bedford, H. H. Lysinger,	184	11.22	16.88	14.50
844	Wheat Bran with Ground Screenings not exceeding Mill Run, Washburn-Crosby Co., Minneapolis, Minn.	Connellsville, Perry & Henderson.	344	10.90	16.38	14.50
	Average,			11.06	16.63	.....
103	Spring Wheat Bran with Ground Screenings not exceeding Mill Run, Western Canada Flour Mills Co., Ltd., Toronto, Canada.	Harrisburg, Paxton Flour & Feed Co.	102	10.76	17.75	16.82
612	Bran and Ground Screenings, Yerca Co., Minneapolis, Minn.	Oil City, Enterprise Milling Co.	612	9.63	13.25	12.00
	Total average,			10.44	16.34	.....
MIXED FEED—RYE BY-PRODUCTS.						
298	Rye Feed, Eagle Roller Mills Co., New Ulm, Minn.	McKeesport, Keystone Commercial Co.	298	10.16	17.00	17.40
WHEAT AND RYE OFFALS.						
1049	Wheat and Rye White Middlings, Mauser Mill Co., Trechlers, Pa.	Nanticoke, Bergin & Co.,	1049	12.85	16.06	15.00
OAT BY-PRODUCTS.						
Oat Feed.						
50	Pure Oat Offal, John R. Burkholder, Lancaster, Pa.	Elizabethtown, Lehman & Wolgemuth.	50	5.10	5.81	6-6.5
98	..... Robin Hood Mills, Ltd., Moose Jaw, Canada.	Middletown, S. C. Brinser,	98	6.77	8.25	5.25
1131	..... Robin Hood Mills, Ltd., Moose Jaw, Canada.	Parkeburg, E. H. Keen & Son.	1131	5.27	7.50	5.25
58	..... Robin Hood Mills, Ltd., Moose Jaw, Canada.	Elizabethtown, Muth Brothers.	58	6.97	6.56	5.25
	Average,			6.33	7.44	.....
OAT HULLS.						
490	Re-ground Oat Hulls, The H. O. Co., Buffalo, N. Y.	New Brighton, J. H. Hornby & Sons.	490	6.59	3.54	4.00

FEEDING STUFFS COLLECTED IN 1915.—Continued

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.63	Per ct. 2.53	Per ct. 8.94	Per ct. 10.22	Per ct. 23.00	.....	Wheat bran and mill run ground screenings.	564
4.64	.....	8.88	.....	23.00	.....	
4.62	4.00	7.69	10.00	28.00	.....	Wheat bran and mill run ground screenings.	1009
4.98	4.00	9.82	11.00	28.00	.....	Wheat bran and mill run ground screenings.	857
5.33	2-5	9.30	10-17	1.45	Wheat bran containing ground screenings not exceeding mill run.	As certified,	916
5.17	4.00	10.23	12.00	1.50	.....	Wheat bran and mill run ground screenings.	184
5.20	4.00	9.50	12.00	1.65	.....	Wheat bran and mill run ground screenings.	344
5.19	.....	9.89	.....	1.58	.....	
5.35	5.50	9.08	10.86	1.45	.....	Wheat bran and mill run ground screenings.	102
5.52	5.50	12.21	13.00	1.50	.....	Wheat bran and ground screenings.	613
4.89	.....	9.61	.....	23.96	.....	
3.77	3.77	7.00	6.97	1.55	.....	Rye bran and rye middlings.	298
4.25	5.00	4.14	5.00	1.90	.....	Wheat and rye middlings.	1049
3.06	2-2.76	29.70	25.00	15.00	.....	Oat feed,	50
3.57	2.50	21.64	23.00	23.50	.....	Oat feed,	38
3.32	2.50	23.35	23.00	23.00	.....	Oat feed,	1131
3.13	2.50	23.47	23.00	1.10	.....	Oat feed,	53
3.34	....	22.82	.....	22.83	.....	
1.13	2.00	23.59	23.00	.....	.....	Ground oat hulls,	490

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
BUCKWHEAT OFFALS.						
Buckwheat Middlings.						
127	..... W. A. Eckenrode, Carrolltown, Pa.	Carrolltown, W. A. Eckenrode.	197	13.55	13.31	.....
202	..... Huntingdon Milling Co., Huntingdon, Pa.	Huntingdon, Huntingdon Milling Co.	202	11.39	32.31	.....
		Average,		12.71	25.31	.....
Buckwheat Feed.						
460	Buckwheat Offal Feed, The Birkett Mills, Penn Yan, N. Y.	Wellsboro, R. J. Dunham,	460	10.31	15.44	10.00
159	Buckwheat Middlings, Williams & Ogline, Somerset, Pa.	Somerset, Williams & Ogline.	159	11.75	19.78	.....
		Average,		11.04	13.11	.....
ALFALFA MEAL.						
1005	..... American Milling Co., Peoria, Ill.	Canonsburg, H. H. Dunlap, Jr.	1005	8.93	13.31	10-13
1216	..... The Albert Dickinson Co., Chicago, Ill.	Blairsville, George J. New,	1216	6.97	15.31	12.00
383	Red Comb, Edwards & Loomis Co., Chicago, Ill.	Bradford, Smith Brothers,	383	7.63	15.75	13.50
74	Pure, The Kansas Alfalfa Products Co., Holcomb, Kans.	Lancaster, Shreiner & Son.	74	8.12	15.33	14.00
618	..... Omaha Alfalfa Milling Co., Omaha, Nebr.	Oil City, New Model Milling Co.	618	8.40	13.35	12.00
670	..... The Park & Pollard Co., Boston, Mass.	Williamsport, F. W. Dawson & Son.	670	8.14	15.31	12.00
808	Lucerne Pure Ground, M. C. Peters Mill Co., Omaha, Nebr.	Reynoldsville, Fales Grocery Co.	808	9.06	15.44	12.00
1121	Peters' Lucerne, M. C. Peters, Mill Co., Omaha, Nebr.	Monongahela, D. E. Gamble.	1121	9.14	13.19	12.00
		Average,		9.10	14.33	.....
812	Purina, Ralston Purina Co., St. Louis, Mo.	Wilkinsburg, Johnston & Smith.	812	10.72	14.50	14.00
919	Wichita Pure, The Wichita Alfalfa Stock Food Co., Wichita, Kans.	Canton, Preston Brothers,	919	10.53	14.44	14.30
		Total average,		8.77	14.74	.....
DRIED BEET PULP.						
1262	..... The Larrowe Milling Co., Detroit, Mich.	Hays, Charles H. Adams.	1262	8.01	8.38	8.00
133	..... The Larrowe Milling Co., Detroit, Mich.	Johnston, G. Bostert & Son.	133	7.25	9.63	8.00
304	..... The Larrowe Milling Co., Detroit, Mich.	Mt. Pleasant, J. H. Brown & Son.	304	9.08	9.31	8.00
365	..... The Larrowe Milling Co., Detroit, Mich.	New Castle City Roller Mills.	365	7.51	9.13	8.00
1142	..... The Larrowe Milling Co., Detroit, Mich.	West Chester, C. O. Hipple & Son.	1142	7.57	8.94	8.00
814	..... The Larrowe Milling Co., Detroit, Mich.	Wilkinsburg, Johnston & Smith.	814	8.13	10.00	8.00
144	..... The Larrowe Milling Co., Detroit, Mich.	Johnstown, Johnstown Milling Co.	144	8.22	8.33	8.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct.	Per ct.	Per ct.	Per ct.	Per ct.			
4.80	.....	4.98	.....	1.75	.....	Buckwheat middlings,...	127
8.37	.....	3.18	.....	30.00	.....	Buckwheat middlings,...	202
6.59	.....	4.08	.....	23.50	.....	
4.00	2.25	22.75	32.00	21.00	Buckwheat offal and buckwheat screenings consisting of buckwheat chaff and weed seeds not exceeding mill run.	Buckwheat middlings, buckwheat hulls and ground screenings.	460
2.88	.....	24.70	.....	29.00	.....	Buckwheat middlings and buckwheat hulls.	152
3.44	.....	29.22	.....	25.00	.....	
1.68	1.00	30.10	35.00	27.00	.....	Alfalfa meal,	1005
1.95	1.00	30.12	35.00	1.80	Made from alfalfa hay.	As certified,	1216
1.93	1.00	27.79	35.00	2.00	Made from alfalfa products.	As certified,	283
1.54	1.20	28.22	32.00	1.55	.....	Alfalfa meal,	74
1.55	1.00	31.67	30.00	1.75	Alfalfa meal.	As certified,	618
1.41	1.50	28.67	30.00	2.00	.....	Alfalfa meal,	670
1.52	0.50	28.57	23.00	1.55	.....	Alfalfa meal,	808
1.95	0.50	33.02	23.00	1.65	Made from pure alfalfa hay.	As certified,	1121
1.74	.....	20.79	.....	1.60	.....	
1.81	1.50	29.08	23.00	2.00	Pure alfalfa hay,.....	As certified,	812
2.12	2.20	30.10	26.00	1.60	.....	Alfalfa meal,	819
1.85	.....	30.13	.....	24.50	.....	
0.83	0.50	18.88	20.00	26.00	Residue of sugar beets dried after extraction of sugar.	As certified,	1262
0.97	0.50	18.83	20.00	26.00	Residue of sugar beets dried after extraction of sugar.	As certified,	138
1.17	0.50	18.69	20.00	1.50	Residue of sugar beets dried after extraction of sugar.	As certified,	304
0.74	0.50	18.48	20.00	23.00	Residue of sugar beets dried after extraction of sugar.	As certified,	865
1.53	0.50	19.36	20.00	27.00	Residue of sugar beets dried after extraction of sugar.	As certified,	1142
1.04	0.50	17.92	20.00	1.50	Residue of sugar beets dried after extraction of sugar.	As certified,	814
1.14	0.50	19.39	20.00	1.55	Residue of sugar beets dried after extraction of sugar.	As certified,	144

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.		
					Found.	Guaranteed.	
291	..... The Larrowe Co., Detroit, Mich.	Milling	McKeesport, Keystone Commercial Co.	291	Per ct. 9.70	Per ct. 8.56	Per ct. 8.00
56	..... The Larrowe Co., Detroit, Mich.	Milling	Elizabethtown, Lehman & Woglemuth.	56	8.87	8.88	8.00
1180	..... The Larrowe Co., Detroit, Mich.	Milling	Turtle Creek, F. J. Riddle,	1180	9.35	8.63	8.00
180	..... The Larrowe Co., Detroit, Mich.	Milling	Johnstown, A. F. Stutzman & Co.	180	10.00	10.44	8.00
1169	..... The Larrowe Co., Detroit, Mich.	Milling	Homestead, Vallowe Brothers.	1169	7.91	8.75	8.00
175	..... The Larrowe Co., Detroit, Mich.	Milling	Windber, Weaver & Berkeley.	175	8.75	9.19	8.00
MIXED FEEDS.		Average, .....	.....	8.48	9.00	.....
Proprietary Dairy Feeds.							
540	Bovineeda, John R. Burkholder, Lancaster, Pa.	Quarryville, Quarryville Farmers Ass'n.	540	8.34	16.00	16-18	
898	Unicorn Dairy Ration, Chapin & Co., Hammond, Ind.	Emporium Emporium Milling Co.	298	6.40	29.13	26.00	
444	Unicorn Dairy Ration, Chapin & Co., Hammond, Ind.	Mansfield, Equity Co-Operative Exchange.	444	6.23	27.44	26.00	
1113	Unicorn Dairy Ration, Chapin & Co., Hammond, Ind.	Monessen, J. A. Hagerman.	1113	7.37	27.44	26.00	
607	Unicorn Dairy Ration, Chapin & Co., Hammond, Ind.	Franklin, J. H. Lavery,...	607	8.33	26.00	26.00	
419	Unicorn Dairy Ration, Chapin & Co., Hammond, Ind.	Westfield, H. Z. Pride & Son.	419	6.74	28.56	26.00	
228	Unicorn Dairy Ration, Chapin & Co., Hammond, Ind.	Myerstown, S. T. Yost,...	228	8.33	27.13	26.00	
Average, .....		.....	.....	7.07	27.63	.....

FEEDING STUFFS COLLECTED IN 1915.—Continued

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct.	Per ct.	Per ct.	Per ct.	Per ct.			
0.92	0.50	18.93	20.00	28.00	.....	Dried beet pulp,	291
1.00	0.50	18.38	20.00	27.00	Residue of sugar beets dried after extraction of sugar.	As certified,	56
1.67	0.50	19.26	20.00	1.65	Residue of sugar beets dried after extraction of sugar.	As certified,	1180
1.51	0.50	18.94	20.00	1.50	Residue of sugar beets dried after extraction of sugar.	As certified,	180
1.00	0.50	19.88	20.00	1.65	Residue of sugar beets dried after extraction of sugar.	As certified,	1169
0.74	0.50	18.55	20.00	28.00	Residue of sugar beets dried after extraction of sugar.	As certified,	175
1.10	.....	18.88	.....	28.00	.....	.....	.....
3.20	3-8.5	20.90	21-33	1.18	Pure cotton seed meal and hulls.	As certified,	540
7.11	5.50	10.25	10.00	1.80	Corn distillers grains, cottonseed meal, linseed meal, hominy meal, gluten feed, (corn starch by-product with corn bran), barley feed, malt sprouts, wheat bran and brewers' grains.	As certified,	298
7.47	5.50	10.65	10.00	24.00	Corn distillers grains, cottonseed meal, linseed meal, hominy meal, gluten feed, (corn starch by-product with corn bran), barley feed, malt sprouts, wheat bran and brewers' grains.	As certified,	444
6.53	5.50	10.60	10.00	1.90	Corn distillers grains, cottonseed meal, linseed meal, hominy meal, gluten feed, (corn starch by-product with corn bran), barley feed, malt sprouts, wheat bran and brewers' grains.	Corn distillers grains, cottonseed meal, linseed meal, hominy meal, corn gluten feed, barley feed, malt sprouts, wheat bran, brewers' grains and milo maize.	1113
8.63	5.50	11.15	10.00	1.85	Corn distillers grains, cottonseed meal, linseed meal, hominy meal, gluten feed, (corn starch by-product with corn bran), barley feed, malt sprouts, wheat bran and brewers' grains.	As certified,	807
6.08	5.50	10.27	10.00	1.75	Corn distillers grains, cottonseed meal, linseed meal, hominy meal, gluten feed, (corn starch by-product with corn bran), barley feed, malt sprouts, wheat bran and brewers' grains.	As certified,	419
6.88	5.50	10.42	10.00	1.80	Corn distillers grains, cottonseed meal, linseed meal, hominy meal, gluten feed, (corn starch by-product with corn bran), barley feed, malt sprouts, wheat bran and brewers' grains.	As certified,	223
7.11	.....	10.55	.....	26.00	.....	.....	.....

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
679	Balanced Ration Dairy Feed, City Flouring Mills, Inc., Muncy, Pa.	Muncy, City Flouring Mills, Inc.	679	Per ct. 9.41	Per ct. 17.94	Per ct. 19.51
666	Balanced Ration Dairy Feed, City Flouring Mills, Inc., Muncy, Pa.	Williamsport, F. W. Dawson & Son.	666	9.33	20.60	19.51
		Average,		9.62	18.97	.....
1189	Globe Creamery Feed, Globe Elevator Co., Buffalo, N. Y.	Brookville, Kline's Sifter Mills.	1189	7.40	26.44	23-25
211	Husted Creamery Food—Justice Brand Scientific, Consolidated Milling Co., Buffalo, N. Y.	Palmyra, J. H. Kettering & Son.	211	8.80	21.75	23-25
519	Dewey's Ready Ration, The Dewey Brothers Co., Blanchester, Ohio.	Danville, Danville Milling Co.	519	7.95	27.69	25.00
907	Dewey's Ready Ration, The Dewey Brothers Co., Blanchester, Ohio.	Butler, B. F. Shannon & Co.	907	9.00	27.00	25.00
		Average,		8.47	27.35	.....
434	Dairy Ration, Elkland Roller Mills, Elkland, Pa.	Elkland, Elkland Roller Mills.	434	9.96	23.50	20-23
446	Equity Dairy Feed, Equity Co-operative Exchange, Mansfield, Pa.	Mansfield, Equity Co-Operative Exchange.	446	7.91	25.63	25.00
537	Bull Dairy Feed, Farmers' Cotton Oil Co., Wilson, N. C.	Quarryville, S. Book & Bro.	537	8.06	13.06	17.00
530	Hex M. M. Dairy Feed, Francis Heck, Shamokin, Pa.	Shamokin, Francis Heck,	530	11.28	14.31	14-15

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 3.73	Per ct. 5.21	Per ct. 9.55	Per ct. 11.50	Per ct. 1.50	Corn meal, buckwheat feed, cottonseed meal and old process oil meal.	As certified,	679
5.53	5.21	10.61	11.50	1.70	Corn meal, buckwheat feed, cottonseed meal and old process oil meal.	As certified,	686
4.66	.....	10.08	.....	1.60			
5.29	5-7	9.89	9.00	1.70	Rye and corn distillers dried grains, brewers' dried grains dried beet pulp, cottonseed meal, linseed oil meal, clipped oat by-product, wheat bran and middlings with ground screenings and salt $\frac{1}{2}$ of 1 per cent.	As certified,	1189
6.20	4-5	8.31	7-9	24.00	Cottonseed meal, corn gluten feed, linseed oil meal, wheat middlings, corn distillers' grains, corn feed meal, clipped oat by-product, malt sprouts or brewers' dried grains, salt $\frac{1}{2}$ of 1 per cent.	Cottonseed meal, corn gluten feed, linseed oil meal, wheat middlings, corn distillers' grains, corn feed meal, clipped oat by-product, malt sprouts, brewers' dried grains and salt.	211
8.18	6.00	9.57	10.00	1.75	Eagle distillers grains, old process oil meal, cottonseed meal, malt sprouts, wheat bran, wheat middlings, hominy feed and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	519
9.09	7.00	9.55	9.00	1.75	Eagle distillers grains, old process oil meal, cottonseed meal, malt sprouts, wheat bran, wheat middlings, hominy feed and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	907
8.64	.....	9.56	.....	1.75			
5.50	2.5-4	7.73	15.00	1.75	Cottonseed meal, oil meal, corn gluten feed, corn meal, wheat bran and brewers' dried grains.	As certified,	431
6.47	6.50	10.57	11.00	33.00	Corn distillers grains, gluten feed, cottonseed meal, hominy meal, brewers' grains, malt sprouts, pure wheat bran, and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	446
2.29	3.50	33.26	30.00	1.30	Cottonseed hulls and cottonseed meal.	Cottonseed meal and large proportion cottonseed hulls with lint.	587
4.23	4-4.5	5.79	4-5.5	1.80	Corn, oats, barley, gluten, wheat middlings, wheat bran, corn bran, oil meal and little grain stock food.	Corn, oats, barley, corn gluten feed, wheat middlings, wheat bran, corn bran, linseed oil meal, charcoal, meat, bone and blood meals, fennel, gentian, foenugreek and licorice root.	530

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
410	Purity Milk Maker, Jamestown Electric Mills, Jamestown, N. Y.	Coudersport, Eulalia Mills,	410	Per ct. 7.19	Per ct. 26.69	Per ct. 22-24
681	Purity Milk Maker, Jamestown Electric Mills, Jamestown, N. Y.	DuBois, Timlin, Kelley & Co.	681	8.41	26.00	22-24
		Average, .....	.....	7.80	26.35	.....
965	Larro-Feed, The Larrowe Milling Co., Detroit, Mich.	Altoona, T. M. Biddle,...	965	9.36	19.33	19.00
225	Larro-Feed, The Larrowe Milling Co., Detroit, Mich.	Myerstown, E. L. Blaistein.	225	9.10	21.12	19.00
862	Larro-Feed, The Larrowe Milling Co., Detroit, Mich.	New Castle, City Roller Mills.	862	8.86	20.32	19.00
440	Larro-Feed, The Larrowe Milling Co., Detroit, Mich.	Knoxville, Deerfield Milling Co.	440	7.35	21.00	19.00
120	Larro-Feed, The Larrowe Milling Co., Detroit, Mich.	Patton F. H. Farabaugh,	120	9.69	20.44	19.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 8.02	Per ct. 7-9	Per ct. 9.85	Per ct. 9-11	Per ct. 1.75	Distillers dried grains, brewers dried grains, wheat bran, wheat middlings, corn gluten feed, cottonseed meal, linseed oil meal, corn meal, malt sprouts and a small percentage of fine salt.	As certified,	410
6.78	7-9	10.23	9-10	1.85	Distillers dried grains, brewers dried grains, wheat bran, wheat middlings, corn gluten feed, cottonseed meal, linseed oil meal, corn meal, malt sprouts and a small percentage of fine salt.	As certified,	631
7.40	.....	10.03	.....	1.80			
4.24	3.00	12.41	14.00	33.00	Cottonseed meal, corn gluten feed, dried distillers grains (mainly from corn), dried beet pulp, standard wheat bran, standard wheat middlings and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	955
3.66	3.00	11.72	14.00	1.60	Cottonseed meal, gluten feed (corn starch by-product with corn bran), dried distillers grains (mainly from corn), dried beet pulp, wheat bran, wheat middlings and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	236
3.88	3.00	11.96	14.00	34.00	Cottonseed meal, corn gluten feed, dried distillers grains (mainly from corn), dried beet pulp, standard wheat bran, standard wheat middlings and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	862
4.32	3.00	12.33	14.00	33.00	Cottonseed meal, corn gluten feed, dried distillers grains (mainly from corn), dried beet pulp, standard wheat bran, standard wheat middlings, and $\frac{1}{2}$ of 1 per cent. salt. Wheat bran and wheat middlings may contain ground screenings not exceeding mill run.	As certified,	440
4.54	3.00	12.53	14.00	1.75	Cottonseed meal, corn gluten feed, dried distillers grains (mainly from corn), dried beet pulp, standard wheat bran, standard wheat middlings, and $\frac{1}{2}$ of 1 per cent. salt. Wheat bran and wheat middlings may contain ground screenings not exceeding mill run.	As certified,	130

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
466	Larro-Feed, The Larro-Feed Milling Co., Detroit, Mich.	Wellsboro, The Farmers' Feed Store.	466	Per ct. 8.50	Per ct. 20.06	Per ct. 19.00
1069	Larro-Feed, The Larro-Feed Milling Co., Detroit, Mich.	Montrose, Harrington & Wilson.	1069	9.30	20.50	19.00
624	Larro-Feed, The Larro-Feed Milling Co., Detroit, Mich.	Indiana, Hetrick, Wilson & Co.	624	9.30	19.88	19.00
192	Larro-Feed, The Larro-Feed Milling Co., Detroit, Mich.	Everett, J. & C. Howard,	192	8.87	21.00	19.00
204	Larro-Feed, The Larro-Feed Milling Co., Detroit, Mich.	Huntingdon, Huntingdon Milling Co.	204	9.11	20.94	19.00
889	Larro-Feed, The Larro-Feed Milling Co., Detroit, Mich.	Butler, H. J. Klingler & Co.	889	9.06	20.63	19.00
796	Larro-Feed, The Larro-Feed Milling Co., Detroit, Mich.	Punxsutawney, Mahoning Valley Milling Co.	796	8.61	20.44	19.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.07	Per ct. 5.00	Per ct. 13.63	Per ct. 14.00	Per ct. 1.70	Cottonseed meal, corn gluten feed, dried distillers grains (mainly from corn), dried beet pulp, standard wheat bran, standard wheat middlings, and $\frac{1}{2}$ of 1 per cent. salt. Wheat bran and wheat middlings may contain ground screenings not exceeding mill run.	As certified,	466
4.23	3.00	12.76	14.00	1.75	Cottonseed meal, corn gluten feed, dried distillers grains (mainly from corn), dried beet pulp, standard wheat bran, standard wheat middlings and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	1060
3.84	3.00	12.45	14.00	23.00	Cottonseed meal, corn gluten feed, dried distillers grains (mainly from corn), dried beet pulp, standard wheat bran, standard wheat middlings and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	624
2.98	3.00	12.67	14.00	1.75	Cottonseed meal, corn gluten feed, dried distillers grains (mainly from corn), dried beet pulp, standard wheat bran, standard wheat middlings, and $\frac{1}{2}$ of 1 per cent. salt. Wheat bran and wheat middlings may contain ground screenings not exceeding mill run.	As certified,	192
3.95	3.00	11.68	14.00	25.00	Cottonseed meal, corn gluten feed, dried distillers grains (mainly from corn), dried beet pulp, standard wheat bran, standard wheat middlings, and $\frac{1}{2}$ of 1 per cent. salt. Wheat bran and middlings may contain ground screenings not exceeding mill run.	As certified,	204
4.00	3.00	12.85	14.00	1.80	Cottonseed meal, Corn gluten feed, dried distillers grains (mainly from corn), dried beet pulp, standard wheat bran, standard wheat middlings and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	883
3.88	3.00	12.95	14.00	1.75	Cottonseed meal, corn gluten feed, dried distillers grains (mainly from corn), dried beet pulp, standard wheat bran, standard wheat middlings and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	796

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
1106	Larro-Feed, The Larro-Feed Milling Co., Detroit, Mich.	Charleroi, R. C. Mountser,	1106	Per ct. 8.55	Per ct. 21.25	Per ct. 19.00
563	Larro-Feed, The Larro-Feed Milling Co., Detroit, Mich.	Vintage, Paradise Farmers' Association, Inc.	563	8.88	20.12	19.00
925	Larro-Feed, The Larro-Feed Milling Co., Detroit, Mich.	Canton, H. Rockwell & Son.	925	9.79	21.12	19.00
402	Larro-Feed, The Larro-Feed Milling Co., Detroit, Mich.	Emporium, E. J. Rodgers,	402	8.53	20.50	19.00
720	Larro-Feed, The Larro-Feed Milling Co., Detroit, Mich.	Lewistown, Spanogle-Yeager Milling Co.	720	8.38	20.12	19.00
455	Larro-Feed, The Larro-Feed Milling Co., Detroit, Mich.	Mansfield, Sun Milling Co.	455	7.45	20.19	19.00
772	Larro-Feed, The Larro-Feed Milling Co., Detroit, Mich.	Titusville, Titusville City Mills.	772	8.77	21.54	19.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 8.90	Per ct. 8.00	Per ct. 11.68	Per ct. 14.00	Per ct. 1.70	Cottonseed meal, corn gluten feed, dried distillers grains (mainly from corn), dried beet pulp, standard wheat bran, standard wheat middlings and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	1106
4.10	3.00	13.23	14.00	34.00	Cottonseed meal, corn gluten feed, dried distillers grains (mainly from corn), dried beet pulp, standard wheat bran, standard wheat bran, dlings, and $\frac{1}{2}$ of 1 per cent. salt. Wheat bran and wheat middlings may contain ground screenings not exceeding mill run.	As certified,	563
3.77	3.00	11.23	14.00	1.60	Cottonseed meal, corn gluten feed, dried distillers grains (mainly from corn), dried beet pulp, standard wheat bran, standard wheat middlings and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	925
4.33	3.00	12.90	14.00	1.70	Cottonseed meal, corn gluten feed, dried distillers grains (mainly from corn), dried beet pulp, standard wheat bran, standard wheat middlings, and $\frac{1}{2}$ of 1 per cent. salt. Wheat bran and wheat middlings may contain ground screenings not exceeding mill run.	As certified,	402
3.80	3.00	12.77	14.00	1.75	Cottonseed meal, corn gluten feed, dried distillers grains (mainly from corn), dried beet pulp, standard wheat bran, standard wheat middlings and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	720
4.47	3.00	13.56	14.00	1.75	Cottonseed meal, corn gluten feed, dried distillers grains (mainly from corn), dried beet pulp, standard wheat bran, standard wheat middlings and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	455
4.44	3.00	12.02	14.00	1.70	Cottonseed meal, corn gluten feed, dried distillers grains (many from corn), dried beet pulp, standard wheat bran, standard wheat middlings and $\frac{1}{2}$ of 1 per cent. salt. Wheat bran and wheat middlings may contain ground screenings not exceeding mill run.	As certified,	772

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
1155	Larro-Feed, The Larrowe Milling Co., Detroit, Mich.	Derry, L. A. Wheeler, .	1155	Per ct. 9.31	Per ct. 20.33	Per ct. 19.00
		Average,		8.35	20.63	.....
123	Mingo Larrowe's High Protein Feed for Dairy Cows, The Larrowe Milling Co., Detroit, Mich.	Patton F. E. Farabaugh,	123	8.35	25.33	25.00
467	Mingo Larrowe's High Protein Feed for Dairy Cows, The Larrowe Milling Co., Detroit, Mich.	Wellsboro, The Farmers' Feed Store.	467	7.96	26.31	25.00
348	Mingo Larrowe's High Protein Feed for Dairy Cows, The Larrowe Milling Co., Detroit, Mich.	Phillipsburg, J. O. Reed,	348	8.72	24.88	25.00
		Average,		8.51	25.53	.....
1019	Best Mixed Feed for Cows, O. P. Matthews & Sons, Inc., Scranton, Pa.	Wilkes-Barre, O. P. Matthews & Sons, Inc.	1019	10.94	19.81	15.00
1082	Best Mixed Feed for Cows, C. P. Matthews & Sons, Inc., Scranton, Pa.	Scranton, C. P. Matthews & Sons, Inc.	1082	10.11	22.25	15.00
		Average,		10.52	21.03	.....
822	Milk and Muscle Producer, C. H. McMahan, Milton, Pa.	Milton, C. H. McMahan,	822	7.98	26.75	22.25
1031	Milhimico Dairy Feed, Miner-Hillard Milling Co., Wilkes-Barre, Pa.	Wilkes-Barre, Miner-Hillard Milling Co.	1031	8.57	18.75	17.20

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.70	Per ct. 3.00	Per ct. 11.91	Per ct. 14.00	Per ct. 33.00	Cottonseed meal, corn gluten feed, dried distillers grains (mainly from corn), dried beet pulp, standard wheat bran, standard wheat middlings and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	1156
4.11	.....	12.49	.....	34.05			
4.02	4.00	11.96	12.00	1.30	Dried beet pulp, cottonseed meal, malt sprouts, corn gluten feed, linseed oil meal, wheat bran which may contain ground screenings not exceeding mill run, dried distillers grains (mainly from corn) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	123
4.62	4.00	11.50	12.00	1.75	Dried beet pulp, cottonseed meal, malt sprouts, corn gluten feed, linseed oil meal, wheat bran which may contain ground screenings not exceeding mill run, dried distillers grains (mainly from corn) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	467
4.31	4.00	12.27	12.00	1.30	Dried beet pulp, cottonseed meal, malt sprouts, corn gluten feed, linseed oil meal, wheat bran which may contain ground screenings not exceeding mill run, dried distillers grains (mainly from corn) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	343
4.32	.....	11.91	.....	1.73			
5.12	5.00	7.35	8.00	32.00	Middlings, corn meal, linseed meal and gluten.	As certified,	1019
4.83	5.00	6.73	8.00	1.70	Middlings, corn meal, linseed meal and gluten.	As certified,	1063
4.98	.....	7.06	.....	32.00			
5.95	6-9	9.63	10-11	32.00	Brewers' dried grains, malt sprouts, cottonseed meal and hominy meal.	As certified,	832
6.06	5-7	9.90	7-9	1.85	Corn oil meal, wheat bran, with screenings not exceeding mill run, cottonseed meal, old process oil meal, hominy feed, wheat middlings with screenings not exceeding mill run, brewers' grains, buckwheat middlings and salt.	As certified,	1061

TABLE V.--ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
1037	Justice Brand Creamery Feed, A. Nowak & Sons, Buffalo, N. Y.	Hazleton, Geo. W. Engle,	1037	Per ct. 8.56	Per ct. 24.19	Per ct. 23.00
710	Justice Brand Scientific Creamery Feed, A. Nowak & Son, Buffalo, N. Y.	Yeagertown, J. M. Yeager.	710	8.84	24.06	22.00
456	Justice Brand Scientific Creamery Feed, A. Nowak & Son, Buffalo, N. Y.	Mansfield, R. W. & M. F. Rose Co.	456	8.32	24.06	22-25
226	Justice Brand Scientific Creamery Feed, A. Nowak & Son, Buffalo, N. Y.	Myerstown, S. T. Yost,...	226	9.05	23.32	22-25
		Average, .....	.....	8.84	23.22	.....
311	Pritts' Alfalfa Cow Feed, J. E. Pritts, Scottdale, Pa.	Scottdale, J. E. Pritts,...	311	11.67	21.82	20-24
353	Buckeye Feed, The Quaker Oats Co., Chicago, Ill.	Osceola Mills, Baird Rick- enbaugh & Co.	354	9.93	17.00	15.50
306	Buckeye Feed, The Quaker Oats Co., Chicago, Ill.	Mt. Pleasant, J. H. Brown & Son.	306	9.80	17.12	15.50
182	Buckeye Feed, The Quaker Oats Co., Chicago, Ill.	Bedford, Davidson Bro- thers.	182	10.92	17.19	15.50
331	Buckeye Feed, Ther Quake Oats Co., Chicago, Ill.	New Sulem Mike Duvava,	331	11.27	16.62	15.50

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 5.43	Per ct. 4.00	Per ct. 9.86	Per ct. 9.00	Per ct. 1.70	Cottonseed meal, corn gluten feed, linseed oil meal, wheat middlings, corn distillers' dried grains, corn feed meal, clipped oat by-product, malt sprouts, brewers' dried grains, ground and bolted wheat screenings, salt $\frac{1}{2}$ of 1 per cent.	Cottonseed meal, linseed oil meal, wheat middlings, corn distillers dried grains, corn feed meal, clipped oat by-product, malt sprouts, brewers dried grains, ground and bolted wheat screenings and salt.	1087
5.89	4.00	9.79	9.00	1.75	Cottonseed meal, corn gluten feed, linseed oil meal, wheat middlings, corn distillers' dried grains, corn feed meal, clipped oat by-product, malt sprouts, brewers' dried grains, ground and bolted wheat screenings, salt $\frac{1}{2}$ of 1 per cent.	As certified,	710
5.68	4-5	9.47	7-9	33.00	Cottonseed meal, wheat middlings, corn distillers' dried grains, corn gluten feed, linseed oil meal, corn feed meal, clipped oat by-product, malt sprouts or brewers' dried grains, salt $\frac{1}{2}$ of 1 per cent.	Cottonseed meal, wheat middlings, corn distillers dried grains, corn gluten feed, corn feed meal, clipped oat by-product and salt.	458
5.93	4-5	9.14	7-9	1.60	Cottonseed meal, wheat middlings, corn distillers' dried grains, corn gluten feed, linseed oil meal, corn feed meal, clipped oat by-product, malt sprouts or brewers' dried grains, salt $\frac{1}{2}$ of 1 per cent.	Cottonseed meal, wheat middlings, corn distillers dried grains, corn gluten feed, linseed oil meal, corn feed meal, clipped oat by-product, malt sprouts, brewers dried grains and salt.	226
5.73	.....	9.56	.....	33.50			
5.12	5-8	7.66	9.00	35.00	Wheat bran, wheat middlings, corn, alfalfa meal, cotton seed meal, and oil meal.	As certified,	311
5.08	4.50	8.15	8.50	1.60	Wheat mixed feed with ground screenings not exceeding mill run and rye shorts.	As certified,	353
5.54	4.50	8.34	8.50	1.50	Wheat mixed feed with ground screenings not exceeding mill run and rye shorts.	As certified,	306
4.88	4.50	7.96	8.50	1.50	Wheat mixed feed with ground screenings not exceeding mill run and rye shorts.	Wheat bran, wheat middlings with mill run ground screenings, rye shorts and trace of whole small weed seeds.	182
5.11	4.50	8.06	8.50	1.50	Wheat mixed feed with ground screenings not exceeding mill run and rye shorts.	Wheat bran, wheat middlings, rye shorts, large amount of chaff and screenings and small amount of whole weed seeds.	331

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
905	Buckeye Feed, The Quaker Oats Co., Chicago, Ill.	Mars, W. J. Kennedy & Son.	905	Per ct. 11.24	Per ct. 16.75	Per ct. 15.50
495	Buckeye Feed, The Quaker Oats Co., Chicago, Ill.	West Bridgewater, W. W. McCullough.	495	9.57	16.83	15.50
1207	Buckeye Feed, The Quaker Oats Co., Chicago, Ill.	Blairsville, J. A. McKelvey.	1207	9.40	15.81	15.50
1109	Buckeye Feed, The Quaker Oats Co., Chicago, Ill.	Charleroi, R. C. Mountser,	1109	9.60	16.50	15.50
		Average,		10.23	16.74	.....
54	Red Letter Brand Cottonseed Feed, W. Newton Smith, Baltimore, Md.	Elizabethtown, Lebman & Wolgemuth.	54	9.43	14.44	17-19
94	Boveta Cottonseed Hull and Meal Mixture, The Southern Cotton Oil Co., Charlotte, N. C.	Middletown, Brinser Milling and Feed Co.	94	9.20	13.31	17.00
544	Ko-Bos Dairy Feed, Southern Fibre Co., Portsmouth, Va.	Bird-in-Hand, J. A. Umbles & Bro.	544	7.88	16.94	16.00
165	Creamo Brand Cottonseed Feed Meal, Tennessee Fibre Co., Memphis, Tenn.	Windber, L. B. Reeser & Co.	165	8.77	22.13	20.00
425	Union Grains-Biles Ready Dairy Ration, The Ubiko Milling Co., Cincinnati, Ohio.	Westfield, Frank A. Ackley.	425	7.70	24.44	24.00
520	Union Grains-Biles Ready Dairy Ration, The Ubiko Milling Co., Cincinnati, Ohio.	Danville, Danville Milling Co.	520	8.08	23.75	24.00
397	Union Grains-Biles Ready Dairy Ration, The Ubiko Milling Co., Cincinnati, Ohio.	Emporium, Emporium Milling Co.	397	7.45	24.69	24.00
90	Union Grains-Biles Ready Dairy Ration, The Ubiko Milling Co., Cincinnati, Ohio.	Harrisburg, Hoffer & Garman.	90	7.78	25.00	24.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 5.47	Per ct. 4.50	Per ct. 7.57	Per ct. 8.50	Per ct. 1.40	Wheat mixed feed with ground screenings not exceeding mill run and rye shorts.	As certified,	905
5.19	4.50	8.62	8.50	1.50	Wheat mixed feed with ground screenings not exceeding mill run and rye shorts.	As certified,	495
6.14	4.50	8.30	8.50	1.35	Wheat mixed feed with ground screenings not exceeding mill run and rye shorts.	As certified,	1207
4.77	4.50	7.00	8.50	1.40	Wheat mixed feed with ground screenings not exceeding mill run and rye shorts.	As certified,	1100
5.21	.....	7.39	.....	1.47			
3.00	2-4	22.00	32-36	23.00	Pure cottonseed meal and pure cottonseed hulls.	As certified,	54
3.16	3.50	29.51	30.00	1.35	.....	Cottonseed hulls and cottonseed meal.	94
3.70	3.10	27.53	22.00	24.00	Cottonseed meal and cottonseed hulls.	As certified,	544
4.96	5.00	22.92	22.00	1.65	Mixture of choice cottonseed meal and cottonseed hull bran.	Cottonseed meal, cottonseed hulls and cottonseed hull bran.	165
7.08	6.00	9.93	9.00	1.75	Fourx distillers dried grains, choice cottonseed meal, old process linseed meal, white wheat middlings, winter wheat bran, hominy meal, barley malt sprouts and $\frac{1}{2}$ of 1 per cent. of fine table salt.	As certified,	425
7.02	7.00	10.16	9.00	1.75	Fourx distillers dried grains, choice cottonseed meal, old process linseed meal, white wheat middlings, winter wheat bran, hominy meal, barley malt sprouts and $\frac{1}{2}$ of 1 per cent. of fine table salt.	As certified,	520
7.60	7.00	9.75	9.00	1.80	Fourx distillers dried grains, choice cottonseed meal, old process linseed meal, white wheat middlings, winter wheat bran, hominy meal, barley malt sprouts and $\frac{1}{2}$ of 1 per cent. of fine table salt.	As certified,	397
6.59	7.00	10.00	9.00	1.65	Fourx distillers dried grains, choice cottonseed meal, old process linseed meal, white wheat middlings, winter wheat bran, hominy meal, barley malt sprouts and $\frac{1}{2}$ of 1 per cent. of fine table salt.	As certified,	90

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's num ber.	Name of Feeding Stuff and Name and Address of Manu- facturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
38	Union Grains—Biles Ready Dairy Ration, The Ubiko Milling Co., Cincinnati, Ohio.	Hanover, Geo. Hull & Sons.	38	Per ct. 7.76	Per ct. 26.75	Per ct. 24.00
208	Union Grains—Biles Ready Dairy Ration, The Ubiko Milling Co., Cincinnati, Ohio.	Palmyra, J. H. Kettering & Son.	208	8.26	24.69	24.00
1190	Union Grains—Biles Ready Dairy Ration, The Ubiko Milling Co., Cincinnati, Ohio.	Brookville, Kline's Sifter Mills.	1190	7.48	25.13	24.00
548	Union Grains—Biles Ready Dairy Ration, The Ubiko Milling Co., Cincinnati, Ohio.	Ronks, E. D. Leaman, ..	548	8.55	24.06	24.00
289	Union Grains—Biles Ready Dairy Ration, The Ubiko Milling Co., Cincinnati, Ohio.	Greensburg, McFarland Supply Co.	289	8.07	24.81	24.00
854	Union Grains—Biles Ready Dairy Ration, The Ubiko Milling Co., Cincinnati, Ohio.	New Castle, New Castle Feed Co.	854	7.27	25.81	24.00
699	Union Grains—Biles Ready Dairy Ration, The Ubiko Milling Co., Cincinnati, Ohio.	McVeytown, John T. Rod- gers.	699	8.24	24.69	24.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 6.54	Per ct. 7.00	Per ct. 9.51	Per ct. 9.00	Per ct. 35.00	Fourx distillers dried grains, choice cottonseed meal, old process linseed meal, white wheat middlings, winter wheat bran, hominy meal, barley malt sprouts and $\frac{1}{2}$ of 1 per cent. of fine table salt.	As certified,	33
6.58	7.00	9.83	9.00	35.00	Fourx distillers dried grains, choice cottonseed meal, old process linseed meal, white wheat middlings, winter wheat bran, hominy meal, barley malt sprouts and $\frac{1}{2}$ of 1 per cent. of fine table salt.	As certified,	208
6.74	7.00	10.02	9.00	1.80	Fourx distillers dried grains, choice cottonseed meal, old process linseed meal, white wheat middlings, winter wheat bran, hominy meal, barley malt sprouts and $\frac{1}{2}$ of 1 per cent. of fine table salt.	As certified,	1190
6.51	7.00	9.64	9.00	24.00	Fourx distillers dried grains, choice cottonseed meal, old process linseed meal, white wheat middlings, winter wheat bran, hominy meal, barley malt sprouts and $\frac{1}{2}$ of 1 per cent. of fine table salt.	As certified,	546
7.28	7.00	9.37	9.00	35.00	Fourx distillers dried grains, choice cottonseed meal, old process linseed meal, white wheat middlings, winter wheat bran, hominy meal, barley malt sprouts and $\frac{1}{2}$ of 1 per cent. of fine table salt.	As certified,	229
6.79	7.00	9.96	9.00	24.00	Fourx distillers dried grains, choice cottonseed meal, old process linseed meal, white wheat middlings, winter wheat bran, hominy meal, barley malt sprouts and $\frac{1}{2}$ of 1 per cent. of fine table salt.	As certified,	354
6.58	7.00	9.57	9.00	1.80	Fourx distillers dried grains, choice cottonseed meal, old process linseed meal, white wheat middlings, winter wheat bran, hominy meal, barley malt sprouts and $\frac{1}{2}$ of 1 per cent. of fine table salt.	As certified,	699

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
35	Sucrene Dairy Feed, American Milling Co., Peoria, Ill.	Littlestown, D. E. Bucky & Son.	35	Per ct. 9.00	Per ct. 17.25	Per ct. 16.50
156	Sucrene Dairy Feed, American Milling Co., Peoria, Ill.	Somerset, John G. Emert,	156	12.96	18.07	16.50
1118	Sucrene Dairy Feed, American Milling Co., Peoria, Ill.	Monongahela, D. E. Gamble.	1118	10.46	19.06	16.50
557	Sucrene Dairy Feed, American Milling Co., Peoria, Ill.	Leaman Place, Harry K. Hershey.	557	9.82	18.94	16.50
43	Sucrene Dairy Feed, American Milling Co., Peoria, Ill.	Hanover, Geo. Hull & Sons.	43	9.84	16.75	16.50
1185	Sucrene Dairy Feed, American Milling Co., Peoria, Ill.	Brookville, Kline's Sifter Mills.	1185	9.35	19.38	16.50
1224	Sucrene Dairy Feed, American Milling Co., Peoria, Ill.	Linesville, Linesville Coal, Lime and Cement Co.	1224	12.59	17.35	16.50
899	Sucrene Dairy Feed, American Milling Co., Peoria, Ill.	Mars, Mars Milling & Feed Co.	899	12.84	18.53	16.50
105	Sucrene Dairy Feed, American Milling Co., Peoria, Ill.	Harrisburg, Mock & Hartman.	105	8.72	16.31	16.50
924	Sucrene Dairy Feed, American Milling Co., Peoria, Ill.	Canton, E. Rockwell & Sons.	924	12.92	18.91	16.50

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 5.45	Per ct. 3.59	Per ct. 12.69	Per ct. 9.00	Per ct. 27.00	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	As certified,	85
6.10	3.50	10.56	12.00	1.40	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	As certified,	156
5.04	3.50	11.89	12.00	1.40	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	As certified,	1118
5.02	3.50	10.95	12.00	1.40	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	As certified,	567
5.00	3.50	13.50	12.00	26.00	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal, salt and trace of whole small weed seeds.	43
4.57	3.50	11.18	12.00	27.00	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product and salt.	1185
4.52	3.50	12.23	12.00	25.00	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	As certified,	1224
5.44	3.50	11.48	12.00	1.35	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	As certified,	899
5.54	3.50	12.63	12.00	26.00	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	As certified,	106
5.15	3.50	11.62	12.00	1.35	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	As certified,	924

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
656	Supreme Dairy Feed, American Milling Co., Peoria, Ill.	Highway, Chas. O. Salberg.	656	Per ct. 11.90	Per ct. 17.85	Per ct. 16.50
251	Sucrene Dairy Feed, American Milling Co., Peoria, Ill.	Fleetwood, Schaeffer, Wanner & Co.	251	14.11	16.24	16.50
973	Sucrene Dairy Feed, American Milling Co., Peoria, Ill.	Carlisle, W. S. Stuart,	973	15.66	16.97	16.50
227	Sucrene Dairy Feed, American Milling Co., Peoria, Ill.	Myerstown, S. T. Yost,	227	12.89	16.55	16.50
		Average,		11.71	17.66	.....
33	Tip Top Sugard Feed, American Milling Co., Peoria, Ill.	Littlestown, D. E. Bucky & Son.	33	9.53	16.00	12.00
1004	Tip Top Sugared Feed, American Milling Co., Peoria, Ill.	Canonsburg, W. H. Dunlap, Jr.	1004	13.46	12.53	12.00
928	Tip Top Sugared Feed, American Milling Co., Peoria, Ill.	Canton, H. Rockwell & Son.	928	11.69	14.69	12.00
		Average,		11.57	14.41	.....
97	Arcady Dairy Feed, Arcady Farms Milling Co., Rondout, Ill.	Middletown, S. C. Brinser,	97	14.00	15.21	16.00
213	Arcady Dairy Feed, Arcady Farms Milling Co., Dondout, Ill.	Palmyra, Early & Detweiler.	213	15.10	14.83	16.00
539	Arcady Dairy Feed, Arcady Farms Milling Co., Dondout, Ill.	Quarryville, Quarryville Farmers' Association.	539	13.92	16.08	16.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.91	Per ct. 3.50	Per ct. 12.24	Per ct. 12.00	Per ct. 30.00	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	As certified,	856
3.83	3.50	11.48	12.00	1.40	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	As certified,	251
4.82	3.50	11.39	12.00	23.00	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	As certified,	973
4.04	2.50	12.06	12.00	1.80	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	As certified,	227
4.94	.....	11.91	.....	27.13			
5.47	2.50	11.62	12.00	25.00	Ground and bolted grain screenings, molasses, clipped oat by-product, cottonseed meal and salt.	As certified,	23
4.40	2.50	12.41	12.00	24.00	Ground and bolted grain screenings, molasses, clipped oat by-product, cottonseed meal and salt.	As certified,	1004
4.98	2.50	13.04	12.00	1.25	Ground and bolted grain screenings, molasses, clipped oat by-product, cottonseed meal and salt.	As certified,	9.
4.96	.....	12.35	.....	24.67			
3.63	3.50	12.67	15.00	26.00	Malt sprouts, dried brewers' grains, cottonseed meal, molasses, ground and bolted clipped oat by-product, cleaned ground and bolted grain screenings and salt.	As certified,	9.
3.00	3.00	12.22	15.00	1.80	Malt sprouts, dried brewers' grains, cottonseed meal, molasses, ground and bolted clipped oat by-product, cleaned ground and bolted grain screenings and salt.	As certified,	215
3.65	3.50	12.22	15.00	1.35	Malt sprouts, dried brewers' grains, cottonseed meal, molasses, ground and bolted clipped oat by-product, cleaned ground and bolted grain screenings and salt.	As certified,	139

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
1086	Arcady Dairy Feed, Arcady Farms Milling Co., Rondout, Ill.	Greenville, Webber Brothers.	1086	Per ct. 14.25	Per ct. 17.28	Per ct. 16.00
		Average, .....	.....	14.31	15.35	.....
510	Dairy Feed, Blank & Gotshall, Sunbury, Pa.	Sunbury, Blank & Gotshall.	510	9.70	12.19	19.5-20.5
2	Clover Leaf Dairy Feed, Clover Leaf Milling Co., Buffalo, N. Y.	York, Anderson Bros. & Co.	2	12.12	14.75	16.50
437	Clover Leaf Dairy Feed, Clover Leaf Milling Co., Buffalo, N. Y.	Knoxville, J. H. Burch,	437	12.33	16.50	16.50
849	Clover Leaf Dairy Feed, Clover Leaf Milling Co., Buffalo, N. Y.	Mifflinburg, R. Foster & Son.	849	14.12	15.84	16.50
1128	Clover Leaf Dairy Feed, Clover Leaf Milling Co., Buffalo, N. Y.	Coatesville, Handwork Bros.	1128	10.65	17.75	16.50
214	Clover Leaf Dairy Feed, Clover Leaf Milling Co., Buffalo, N. Y.	Palmyra, J. H. Kettering & Son.	214	13.27	18.16	16.50

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 2.86	Per ct. 2.50	Per ct. 11.07	Per ct. 15.00	Per ct. 1.40	Malt sprouts, dried brewers' grains, cottonseed meal, molasses, ground and bolted clipped oat by-product, cleaned ground and bolted grain screenings and salt.	As certified,	1086
3.29	.....	12.04	.....	25.75			
3.94	4.5	13.53	10-11	32.00	Beet pulp, corn bran, gluten feed, wheat bran, wheat middlings, dried brewers' grains, cottonseed meal, alfalfa, molasses, oats chop.	As certified,	510
3.41	3.50	11.90	12.00	25.50	Cottonseed meal, corn gluten feed, mixed broken grains consisting of wheat, corn, barley, flax, spelt, ground grain screenings, clipped oat by-product, molasses, and small percentage of salt.	As certified,	2
3.62	3.50	11.65	12.00	1.40	Cottonseed meal, corn gluten feed, mixed broken grains consisting of wheat, corn, barley, flax, spelt, ground grain screenings, clipped oat by-product, molasses, and small percentage of salt.	As certified,	437
4.18	3.50	10.38	12.00	1.50	Cottonseed meal, corn gluten feed, mixed broken grains consisting of wheat, corn, barley, flax, spelt, ground grain screenings, clipped oat by-product, molasses, and small percentage of salt.	Cottonseed meal, mixed broken grains consisting of wheat, corn, barley, flax, spelt, ground grain screenings, clipped oat by-product, molasses and salt.	849
3.18	3.50	11.80	12.00	27.00	Cottonseed meal, corn gluten feed, mixed broken grains consisting of wheat, corn, barley, flax, spelt, ground grain screenings, clipped oat by-product, molasses, and small percentage of salt.	Cottonseed meal, corn gluten feed, mixed broken grains of wheat, corn, barley, flax, spelt, ground grain screenings, clipped oat by-product, malt sprouts, molasses and salt.	1126
4.08	3.50	10.79	12.00	26.00	Cottonseed meal, corn gluten feed, mixed broken grains consisting of wheat, corn, barley, flax, spelt, ground grain screenings, clipped oat by-product, molasses, and small percentage of salt.	As certified,	214

TABLE V—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Crude Protein.		
				Moisture.	Found.	Guaranteed.
59	Clover Leaf Dairy Feed, Clover Leaf Milling Co., Buffalo, N. Y.	Elizabethtown, Muth Bros.	59	Per ct. 13.27	Per ct. 15.34	Per ct. 16.50
238	Clover Leaf Dairy Feed, Clover Leaf Milling Co., Buffalo, N. Y.	Annaville, Newgard & Bachman.	238	14.63	19.13	16.50
73	Clover Leaf Dairy Feed, Clover Leaf Milling Co., Buffalo, N. Y.	Lancaster, Shreiner & Son,	73	14.20	15.50	16.50
967	Clover Leaf Dairy Feed, Clover Leaf Milling Co., Buffalo, N. Y.	Carlisle, Frank E. Thompson.	967	14.55	16.44	16.50
545	Clover Leaf Dairy Feed, Clover Leaf Milling Co., Buffalo, N. Y.	Bird-in-Hand, J. A. Umbles & Bro.	545	13.93	17.23	16.50
748	Clover Leaf Dairy Feed, Clover Leaf Milling Co., Buffalo, N. Y.	Lock Haven, E. E. Wents,	748	14.36	15.86	16.50
		Average, .....	.....	13.63	16.59	.....
589	Dixie Dairy Feed, Dixie Mills Co., E. St. Louis, Ill.	Parnassus, Johnston & Hamilton.	589	15.34	16.75	17.00
915	Dixie Dairy Feed, Dixie Mills Co., E. St. Louis, Ill.	Butler, Geo. Walter & Sons.	915	14.49	16.23	17.00
		Average, .....	.....	14.91	16.52	... ..

FEEDING STUFFS COLLECTED IN 1915.--Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.06	Per ct. 3.50	Per ct. 12.71	Per ct. 12.00	Per ct. 1.25	Cottonseed meal, corn gluten feed, mixed broken grains consisting of wheat, corn, barley, flax, spelt, ground grain screenings, clipped oat by-product, molasses, and small percentage of salt.	Cottonseed meal, small amount corn gluten feed, mixed broken grains of wheat, corn barley, flax, spelt, ground grain screenings, clipped oat by-product, molasses, salt and trace small whole weed seeds.	59
4.16	3.50	11.49	12.00	26.00	Cottonseed meal, corn gluten feed, mixed broken grains consisting of wheat, corn, barley, flax, spelt, ground grain screenings, clipped oat by-product, molasses, and small percentage of salt.	As certified,	233
3.76	3.50	12.12	12.00	1.30	Cottonseed meal, corn gluten feed, mixed broken grains consisting of wheat, corn, barley, flax, spelt, ground grain screenings, clipped oat by-product, molasses, and small percentage of salt.	Cottonseed meal, small amount corn gluten feed, mixed broken grains of wheat, corn barley, flax, spelt, ground grain screenings, clipped oat by-product, molasses, salt and trace small whole weed seeds.	73
4.26	3.50	11.76	12.00	1.40	Cottonseed meal, corn gluten feed, mixed broken grains consisting of wheat, corn, barley, flax, spelt, ground grain screenings, clipped oat by-product, molasses, and small percentage of salt.	Cottonseed meal, mixed broken grains of wheat, corn, barley, flax, spelt, ground grain screenings, clipped oat by-product, molasses and salt.	967
4.25	3.50	11.63	12.00	26.00	Cottonseed meal, corn gluten feed, mixed broken grains consisting of wheat, corn, barley, flax, spelt, ground grain screenings, clipped oat by-product, molasses, and small percentage of salt.	As certified,	545
4.24	3.50	11.63	12.00	1.50	Cottonseed meal, corn gluten feed, mixed broken grains consisting of wheat, corn, barley, flax, spelt, ground grain screenings, clipped oat by-product, molasses, and small percentage of salt.	As certified,	743
3.94	.....	11.61	.....	27.05			
4.58	3.50	11.61	12.00	30.00	Ground alfalfa, cottonseed meal, corn meal, sugar cane molasses, and ground flaxseed screenings.	As certified,	589
4.69	3.50	12.42	12.00	1.50	Ground alfalfa, cottonseed meal, corn meal, sugar cane molasses, and ground flaxseed screenings.	As certified,	915
4.64	.....	12.01	.....	30.00			

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
822	Ce-re-lia Sweets for Dairy, The Early & Daniel Co., Cincinnati, Ohio.	Carnegie, Richey & Carlisle.	822	Per ct. 15.53	Per ct. 21.61	Per ct. 19.00
233	Crystaloid Dairy Feed, Jonas F. Eby & Son, Lancaster, Pa.	Myerstown, E. L. Bielestein.	233	10.50	18.00	16.50
535	Crystaloid Dairy Feed, Jonas F. Eby & Son, Lancaster, Pa.	Quarryville, Crowl & Greenleaf.	535	9.38	19.25	16.50
		Average,		10.19	18.63	.....
1067	Essee Dairy Feed, Empire Grain & Elevator Co., Binghamton, N. Y.	Montrose, Harrington & Wilson.	1067	15.91	15.53	16.00
72	Gehelman's Home Made Dairy Feed, John W. Gehelman, Lancaster, Pa.	Lancaster, John W. Gehelman.	72	10.67	21.38	20-22
398	Varamel Dairy Feed, Varamel Manufacturing Co., Buffalo, N. Y.	Smethport, F. A. Greene,	398	15.11	22.88	23-25
462	Anchor Dairy Feed, Globe Elevator Co., Buffalo, N. Y.	Wellsboro, R. J. Dunham,	462	15.97	15.88	18-20
795	Anchor Dairy Feed, Globe Elevator Co., Buffalo, N. Y.	Punxsutawney, Jefferson Flour and Feed Co.	795	14.56	16.02	18-20

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.47	Per ct. 4.50	Per ct. 7.32	Per ct. 9.00	Per ct. 1.75	Brewers' grains, corn meal distillers grains, malt sprouts, cottonseed meal, molasses.	As certified,	322
4.72	3.50	11.43	12.00	1.25	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	As certified,	223
4.86	2.50	12.21	12.00	26.00	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal, salt and small amount small whole weed seeds.	535
4.79	.....	11.87	.....	25.50			
4.66	2.00	10.01	15.00	1.85	Cottonseed meal, malt sprouts, ground and bolted grain screenings from wheat, oats and flax, $\frac{1}{2}$ of 1 per cent. salt and molasses.	As certified	1067
4.44	5-6	9.21	9-11	32.00	Gluten feed, linseed meal, broken grains from cereal plant separated from wheat, oats, barley, distillers grains, cottonseed meal, salt, wheat bran and molasses.	As certified,	72
3.37	3-4	8.17	8-9	1.75	Brewers dried grains, corn gluten feed, linseed oil meal, wheat bran, molasses and 1 per cent. salt.	As certified,	393
2.92	4-5	8.86	9.00	1.40	Cottonseed meal, corn gluten feed, linseed oil meal, malt sprouts, rye and corn distillers dried grains, corn meal, corn bran, ground grain screenings, clipped oat by-product, wheat middlings, molasses, salt $\frac{1}{2}$ of 1 per cent.	As certified,	462
3.52	4-8	9.29	9.00	.....	Cottonseed meal, corn gluten feed, linseed oil meal, malt sprouts, dried brewers' grains, corn meal, corn bran, ground grain screenings, clipped oat by-product, wheat middlings, molasses and salt $\frac{1}{2}$ of 1 per cent.	As certified,	795

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
792	Anchor Dairy Feed, Globe Elevator Co., Buffalo, N. Y.	Lindsey, Keystone Flour & Feed Co.	792	Per ct. 15.00	Per ct. 16.03	Per ct. 15-20
		Average,		15.17	15.96	.....
1227	Holstein Molasses Feed, F. W. Goeke Co., St. Louis, Mo.	Erie, A. P. Allen,	1227	11.46	16.41	15-17
19	Golden Grain Dairy Feed, Golden Feed, Golden Grain Milling Co., East St. Louis, Ill.	York, John W. Royer, ..	19	14.60	14.54	16.50
15	Golden Grain Dairy Feed, Golden Grain Milling Co., E. St. Louis, Ill.	York, P. A. & S. Small Co.	15	12.71	14.52	.....
		Average,		12.70	14.53	.....
515	June Bug Cane Molasses Dairy Feed, The Goldsboro Pure Feed Co., Goldsboro, Pa.	Sunbury, Kift Milling Co.,	515	9.00	16.19	13.00
1119	Ohio Valley Dairy Feed, Dwight E. Hamlin, Pittsburgh, Pa.	Monongahela, D. E. Gamble.	1119	12.97	22.63	16.00
484	H. & S. Alfalfa Feed for Milch Cows, Dwight E. Hamlin, Pittsburgh, Pa.	West Bridgewater, W. W. McCullough.	484	11.87	22.59	23-25
491	H. & S. Alfalfa Feed for Milch Cows, Dwight E. Hamlin, Pittsburgh, Pa.	New Brighton, M. H. Stager.	484	12.92	19.95	20-25
		Average,		12.39	21.23	.....
486	Hornby's Molasses Dairy Feed, J. H. Hornby & Sons, New Brighton, Pa.	New Brighton, J. H. Hornby & Sons.	486	11.27	25.45	25.00
1247	International Cattle Feed, International Sugar Feed Co., Minneapolis.	Erie, Erie Milling & Supply Co.	1247	10.15	25.36	25.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 8.66	Per ct. 4-8	Per ct. 10.08	Per ct. 9.00	Per ct. 1.65	Cottonseed meal, corn gluten feed, linseed oil meal, malt sprouts, dried brewers' grains, corn meal, corn bran, ground grain screenings, clipped oat by-product, wheat middlings, molasses and salt $\frac{1}{2}$ of 1 per cent.	As certified,	752
3.27	.....	9.41	.....	30.50			
3.43	3-4	12.24	15-10	1.00	Cottonseed meal, alfalfa, ground grain screenings, malt sprouts, shipstuf, cane molasses and salt.	Corn distillers grains, malt sprouts, cottonseed meal, alfalfa and screenings containing corn, oats, wheat, barley, millet, flaxseed, oat and barley hulls, chaff, weed seeds, molasses and salt, charred and in bad condition.	1227
3.59	3.50	12.03	12.00	27.00	Cottonseed meal, clipped oat by-product, reground grain screenings and molasses, $\frac{1}{2}$ of 1 per cent. salt.	As certified,	19
4.06	.....	12.33	.....	27.00	.....	Cottonseed meal, clipped oat by-product, ground grain screenings, molasses and salt.	18
3.31	.....	12.13	.....	27.00			
3.87	4.50	12.22	12.00	1.50	Brewers' grains, malt sprouts, ground grain screenings meal, wheat middlings, wheat bran, cottonseed meal, oat clippings, gluten feed, pure cane molasses and $\frac{1}{2}$ of 1 per cent. salt.	Brewers dried grains, malt sprouts, ground grain screenings meal, wheat middlings, wheat bran, cottonseed meal, clipped oat by-product, corn gluten feed, cane molasses, salt and small amount small whole weed seeds.	515
5.50	3.00	10.23	15.00	1.60	Cottonseed meal, distillers grains and cane syrup.	Cottonseed meal, brewers dried grains and cane molasses.	1119
5.43	3.50	11.64	16.00	1.65	Alfalfa, cottonseed meal, pure cane molasses, brewers' and distillers dried grains and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	491
4.93	4.00	13.64	16.00	1.55	Alfalfa, cottonseed meal, cane syrup and dried grains.	Alfalfa, cottonseed meal, brewers dried grains and cane molasses.	484
5.13	.....	12.64	.....	1.60			
3.58	3.50	10.48	12.00	1.50	Hominy feed, malt sprouts, wheat bran with ground screenings not exceeding mill run, cottonseed meal, molasses, linseed meal, oat meal mill by-product, oat shorts, oat hulls and oat middlings.	As certified,	486
6.34	5.00	9.13	10.00	33.00	Cottonseed meal, old process linseed oil meal, molasses, bran, middlings, salt.	Cottonseed meal, ground grain screenings, small amount small whole weed seeds, molasses and salt.	1247

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
893	International Cattle Feed, International Sugar Feed Co., Minneapolis, Minn.	Butler, P. J. Oesterling & Son.	893	Per ct. 11.10	Per ct. 23.31	Per ct. 25.00
		Average, .....	.....	10.62	26.85	.....
1251	International Special Dairy Feed, International Sugar Feed Co., Minneapolis, Minn.	Erie, Erie Milling & Supply Co.	1251	10.13	16.13	15.00
940	International Special Dairy Feed, International Sugar Feed Co., Minneapolis, Minn.	Troy, Farmers & Consumers' Commercial Union.	940	11.49	15.06	15.00
55	International Special Dairy Feed, International Sugar Feed Co., Minneapolis, Minn.	Elizabethtown, Lehman & Woglemuth.	55	10.33	16.12	15.00
472	International Special Dairy Feed, International Sugar Feed Co., Minneapolis, Minn.	Monaca, Monaca Roller Mills.	472	10.57	16.44	15.00
268	International Sugar Dairy Feed Co., Minneapolis, Minn. Feed, International Sugar	Mt. Penn. Nein Bros.,...	268	9.87	16.63	15.00
897	International Sugar Dairy Feed, International Sugar Feed Co., Minneapolis, Minn.	Butler, P. J. Oesterling & Son.	897	11.20	16.19	15.00
		Average, .....	.....	10.60	16.10	.....
601	Venango Dairy Feed, Johnson & Co., Franklin, Pa.	Franklin, Johnson & Co.,	601	9.83	20.00	12-20
324	Kaw-Kaw Dairy Feed, Kornfalfa Feed Milling Co., Kansas City, Mo.	Uniontown, King Bros., ..	324	17.10	16.51	16.50
1229	Badger Dairy Feed, Chas. A. Krause Milling Co., Milwaukee, Wis.	Erie, A. P. Allen,	1229	10.76	17.00	16.00
1132	Badger Dairy Feed, Chas. A. Krause Milling Co., Milwaukee, Wis.	Parkesburg, S. H. Keen & Son.	1132	13.63	15.16	11.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 7.65	Per ct. 5.00	Per ct. 9.63	Per ct. 10.00	Per ct. 1.70	Cottonseed meal, old process linseed oil meal, molasses, grain middlings, salt.	Cottonseed meal, linseed meal, ground grain screenings, molasses and salt.	893
7.25	.....	9.33	.....	23.50			
6.47	4.50	11.49	12.00	25.00	Cottonseed meal, molasses, ground clipped oat by-product, salt, ground cleaned grain screenings.	Cottonseed meal, ground clipped oat by-product, ground grain screenings, small amount small whole weed seeds, molasses and salt.	1251
4.69	4.50	8.16	12.00	1.30	Cottonseed meal, molasses, ground clipped oat by-product, salt, ground cleaned grain screenings.	As certified,	940
4.65	4.50	12.67	12.00	25.00	Cottonseed meal, molasses, ground clipped oat by-product, salt, ground cleaned grain screenings.	Cottonseed meal, ground clipped oat by-product, ground grain screenings, small amount small whole weed seeds, molasses and salt.	55
4.96	4.50	12.05	12.00	1.35	Cottonseed meal, molasses, ground clipped oat by-product, salt, ground cleaned grain screenings.	Cottonseed meal, ground clipped oat by-product, ground grain screenings, small amount small whole weed seeds, molasses and salt.	472
5.04	4.50	12.15	12.00	1.40	Cottonseed meal, molasses, ground clipped oat by-product, salt, ground cleaned grain screenings.	As certified,	263
5.43	4.50	12.77	12.00	1.40	Cottonseed meal, molasses, ground clipped oat by-product, salt, ground cleaned grain screenings.	Cottonseed meal, ground clipped oat by-product, ground grain screenings, small amount small whole weed seeds, molasses and salt.	897
5.20	.....	12.04	.....	26.50			
5.73	5-6	10.19	8-9	32.00	Cottonseed meal, corn meal, dried brewers' grains and molasses.	Cottonseed meal, corn meal, yeast dried grains (from corn, barley malt and malt sprouts), molasses and small amount ground screenings with trace of whole weed seeds.	601
2.40	3.00	10.04	12.50	1.80	Alfalfa meal, corn, Kaffir corn, cottonseed meal, brewers' grains, wheat middlings and molasses.	As certified,	
8.34	2.00	12.38	15.00	1.25	Cottonseed meal, malt sprouts, ground and bolted screenings from wheat, oats and flax, $\frac{1}{2}$ of 1 per cent. salt and molasses.	Cottonseed meal, ground and bolted grain screenings from wheat, oats, and flax, small amount small whole weed seeds, molasses and salt.	1229
4.81	2.00	10.33	15.00	23.00	Cottonseed meal, malt sprouts, ground and bolted screenings from wheat, oats and flax, $\frac{1}{2}$ of 1 per cent. salt and molasses.	As certified,	1132

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
234	Badger Dairy Feed, Chas. A. Krause Milling Co., Milwaukee, Wis.	Greensburg, McFarland Supply Co.	234	Per ct. 15.08	Per ct. 17.73	Per ct. 16.00
1212	Badger Dairy Feed, Chas. A. Krause Milling Co., Milwaukee, Wis.	Blairsville, Geo. J. New,	1212	13.79	17.06	16.00
264	Badger Dairy Feed, Chas. A. Krause Milling Co., Milwaukee, Wis.	Reading, Werts Milling Co.	264	14.22	16.05	16.00
		Average,		13.49	16.68	.....
605	Hart's Special Dairy Feed, The Lake Shore Elevator Co., Cleveland, Ohio.	Franklin, J. H. Lavery,	605	13.75	20.25	24.00
1244	Lake Shore Dairy Feed, The Lake Shore Elevator Co., Cleveland, Ohio.	Erie, C. J. Farley & Son,	1244	12.45	15.40	17.00
598	Lake Shore Dairy Feed, The Lake Shore Elevator Co., Cleveland, Ohio.	New Kensington, J. A. Hawk.	598	13.00	14.98	17.00
		Average,		13.02	15.19	.....
47	Ox-O Pure Cane Molasses Concentrated Dairy Feed. The New Oxford Pure Feed Co., New Oxford, Pa.	Hanover, High Street Produce Co.	47	5.97	27.56	23.00
151	Ox-O Pure Cane Molasses Concentrated Dairy Feed. The New Oxford Pure Feed Co., New Oxford, Pa.	Somerset, Williams & Ogline.	151	7.33	23.56	23.00
		Average,		6.65	23.06	.....
148	No. 1 Ox-O Pure Cane Molasses Dairy Feed, The New Oxford Pure Feed Co., New Oxford Pa.	Somerset, Williams & Ogline.	148	7.43	23.12	25.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.25	Per ct. 2.00	Per ct. 12.50	Per ct. 15.00	Per ct. 1.25	Cottonseed meal, malt sprouts, ground and bolted screenings from wheat, oats and flax, $\frac{1}{2}$ of 1 per cent. salt and molasses.	As certified,	281
3.62	2.00	10.86	15.00	1.40	Cottonseed meal, malt sprouts, ground and bolted screenings from wheat, oats and flax, $\frac{1}{2}$ of 1 per cent. salt and molasses.	As certified,	1212
4.72	2.00	12.25	15.00	1.30	Cottonseed meal, corn oil meal, malt sprouts, brewers dried grains, alfalfa meal, ground and bolted grain screenings from wheat and flax $\frac{1}{2}$ of 1 per cent. salt and molasses.	As certified,	264
5.17	.....	11.89	.....	26.80			
4.72	4.50	9.96	9.00	1.80	Cottonseed meal, brewers' grains, malt sprouts, corn bran, molasses, and $\frac{1}{2}$ of 1 per cent. salt.	Cottonseed meal, brewers dried grains, malt sprouts, corn bran, oat hulls, small amount ground grain screenings and whole weed seeds, molasses and salt.	605
3.70	3.00	10.45	11.00	1.30	Cottonseed meal, distillers grains, malt sprouts, corn, corn bran, screenings, molasses, and $\frac{1}{2}$ of 1 per cent. salt.	Cottonseed meal, brewers dried grains, malt sprouts, corn bran, corn, grain screenings, molasses and salt.	1244
4.73	3.00	12.80	11.00	1.50	Cottonseed meal, distillers grains, malt sprouts, corn, corn bran, screenings, molasses, and $\frac{1}{2}$ of 1 per cent. salt.	Cottonseed meal, corn distillers dried grains, malt sprouts, corn, corn bran, grain screenings, small amount of whole weed seeds, molasses and salt.	598
4.22	.....	11.62	.....	1.40			
5.73	5.50	11.67	8.00	24.00	Cottonseed meal, new process linseed meal, corn gluten feed, brewers grains, malt sprouts, pure cane molasses, and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	47
6.60	5.50	11.24	8.00	24.00	Cottonseed meal, new process linseed meal, corn gluten feed, brewers grains, malt sprouts, pure cane molasses, and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	151
6.17	.....	11.45	.....	24.00			
6.50	4.50	11.55	9.00	22.00	Cottonseed meal, corn gluten feed, new process linseed meal, wheat bran, wheat middlings, ground corn, brewers grains, malt sprouts, pure cane molasses, and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	148

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
44	Ox-O No. 2 Pure Cane Molasses Dairy Feed, The New Oxford Pure Feed Co., New Oxford, Pa.	Hanover, High Street Produce Co.	44	Per ct. 7.11	Per ct. 22.81	Per ct. 19.00
150	Ox-O No. 2 Pure Cane Molasses Dairy Feed, The New Oxford Pure Feed Co., New Oxford, Pa.	Somerset, Williams & Ogline.	150	6.65	20.19	19.00
	Average,			6.83	21.50	.....
322	Challenge Dairy Feed, New-some Feed & Grain Co., Pittsburgh, Pa.	Scottdale, F. V. Perry, ..	322	13.92	18.14	16.00
343	Challenge Dairy Feed, New-some Feed & Grain Co., Pittsburgh, Pa.	Connellsville, Perry & Henderson.	343	14.56	18.11	16.00
	Average,			14.24	18.13	.....
1086	Butterine Dairy Feed, A. Nowak & Son, Buffalo, N. Y.	Hazleton, Geo. W. Engle,	1086	14.59	16.40	17.50
707	Butterine Dairy Feed, A. Nowak & Son, Buffalo, N. Y.	Yeagertown, J. M. Yeager,	707	13.97	16.67	17.50
	Average,			14.28	16.54	.....
713	Creamoline Dairy Feed, A. Nowak & Son, Buffalo, N. Y.	Yeagertown, J. M. Yeager,	713	14.14	21.35	20.00
4	Green Meadow Dairy Feed, Omaha Alfalfa Milling Co., Omaha, Nebr.	York, Anderson Bros. & Co.	4	15.25	11.50	11.00
350	Green Meadow Dairy Feed, Omaha Alfalfa Milling Co., Omaha, Nebr.	Phillipsburg, C. O. Reed,	350	17.49	11.19	11.00
	Average,			16.37	11.34	.....

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 5.68	Per ct. 3.50	Per ct. 14.06	Per ct. 11.00	Per ct. 27.00	Brewers grains, malt sprouts, corn meal, wheat middlings, wheat bran, cottonseed meal, corn gluten feed, pure cane molasses and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	44
6.75	3.50	14.50	11.00	28.00	Brewers grains, malt sprouts, corn meal, wheat middlings, wheat bran, cottonseed meal, corn gluten feed, pure cane molasses and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	150
6.22	.....	14.28	.....	27.50			
4.85	2.00	12.66	15.00	1.50	Cottonseed meal, malt sprouts, ground and bolted screenings from wheat, oats and flax, $\frac{1}{2}$ of 1 per cent. salt and molasses.	As certified,	322
4.84	2.00	7.41	5.00	1.60	Cottonseed meal, malt sprouts, ground and bolted screenings from wheat, oats and flax, $\frac{1}{2}$ of 1 per cent. salt and molasses.	As certified,	343
4.85	.....	10.08	.....	1.55			
4.85	4.00	12.72	12.00	1.25	Cottonseed meal, malt sprouts, dried brewers grains, clipped oat by-product, ground and bolted grain screenings, molasses, $\frac{1}{2}$ of 1 per cent. salt.	As certified,	1086
4.30	4.00	12.53	12.00	1.50	Cottonseed meal, malt sprouts, dried brewers grains, clipped oat by-product, ground and bolted grain screenings, molasses, $\frac{1}{2}$ of 1 per cent. salt.	As certified,	707
4.58	.....	13.12	.....	1.43			
4.82	4.00	7.95	9.00	1.85	Cottonseed meal, corn gluten feed, linseed oil meal, wheat middlings, corn distillers dried grains, corn feed meal, clipped oat by-product, malt sprouts, brewers dried grains, ground and bolted wheat screenings molasses, $\frac{1}{2}$ of 1 per cent. salt.	As certified,	713
0.94	1.00	17.02	25.00	28.00	Alfalfa meal and syrup.	As certified, ..	1
0.89	1.00	16.62	25.00	1.50	Alfalfa meal and syrup.	As certified, ..	350
0.92	.....	16.82	.....	29.00	.....	

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
1222	Challenge Dairy Feed, The D. H. Owen Co., Youngstown, Ohio.	Linesville, Linesville Coal, Lime and Cement Co.	1222	Per ct. 10.51	Per ct. 16.55	Per ct 16.50
309	Blue Ribbon Dairy Feed, The Quaker Oats Co., Chicago, Ill.	Greensburg, D. F. Kilgore & Co.	209	9.07	25.32	25.00
333	Blue Ribbon Dairy Feed, The Quaker Oats Co., Chicago, Ill.	Lewisburg, E. C. Noll, ... & Co.	333	12.00	26.63	25.00
643	Blue Ribbon Dairy Feed, The Quaker Oats Co., Chicago, Ill.	St. Marys, Leonard Ritter,	643	9.60	25.63	25.00
		Average, .....	.....	10.23	25.90	.....
779	Quaker Dairy Feed with molasses, The Quaker Oats Co., Chicago, Ill.	Spartansburg, Brooklyn Milling Co.	779	10.90	16.32	16.00
782	Quaker Dairy Feed with molasses, The Quaker Oats Co., Chicago, Ill.	Spartansburg, Davis & Hyde.	782	9.79	17.00	16.00
333	Quaker Dairy Feed with molasses, The Quaker Oats Co., Chicago, Ill.	New Salem, Mike Duyava,	333	14.02	15.77	16.00
535	Quaker Dairy Feed with molasses, The Quaker Oats Co., Chicago, Ill.	New Kensington, A. H. Kirgh.	535	12.13	15.79	16.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 3.13	Per ct. 3.00	Per ct. 13.10	Per ct. 12.00	Per ct. 24.00	Cottonseed meal, alfalfa meal, malt sprouts, malt, molasses, ground mixed broken grains from screenings containing corn, barley, wheat, oat clips and fax.	Cottonseed meal, alfalfa meal, malt sprouts, ground grain screenings from corn, oats, barley, wheat fax, clipped oat by-product, molasses, salt and small amount whole weed seeds.	1222
3.88	3.50	10.69	12.00	1.80	Cottonseed meal, wheat bran with ground screenings not exceeding mill run, malt sprouts, molasses, hominy feed, linseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts).	As certified,	309
4.28	3.50	12.46	12.00	22.00	Wheat bran with ground screenings not exceeding mill run, cottonseed meal, malt sprouts, molasses, hominy feed, new process linseed oil meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts.)	As certified,	335
3.68	3.50	10.94	12.00	1.75	Wheat bran with ground screenings not exceeding mill run, cottonseed meal, malt sprouts, molasses, hominy feed, new process linseed oil meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts.)	As certified,	648
3.95	.....	11.36	.....	24.23			
4.20	4.00	6.34	14.50	27.00	Molasses, malt sprouts, cottonseed meal, ground grain screenings, clipped oat by-product and linseed meal.	Molasses, cottonseed meal, N. P. linseed meal, clipped oat by-product, ground grain screenings and small amount whole weed seeds.	779
5.18	4.00	12.53	14.50	27.00	Molasses, malt sprouts, cottonseed meal, ground grain screenings, clipped oat by-product and linseed meal.	Molasses, cottonseed meal, N. P. linseed meal, clipped oat by-product, ground grain screenings and small amount whole weed seeds.	782
4.44	4.00	10.27	14.50	1.45	Molasses, malt sprouts, cottonseed meal, ground grain screenings, clipped oat by-product and linseed meal.	Molasses, malt sprouts, cottonseed meal, N. P. linseed oil meal, clipped oat by-product ground grain screenings and small amount whole weed seeds.	332
4.34	4.00	11.93	14.50	1.50	Molasses, malt sprouts, cottonseed meal, ground grain screenings, clipped oat by-product and linseed meal.	Molasses, malt sprouts, cottonseed meal, N. P. linseed oil meal, clipped oat by-product, ground grain screenings and small amount whole weed seeds.	386

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
1134	Quaker Dairy Feed with molasses, The Quaker Oats Co., Chicago, Ill.	E. Downingtown, J. W. Maxwell.	1134	Per ct. 8.79	Per ct. 16.06	Per ct. 16.00
1206	Quaker Dairy Feed with molasses, The Quaker Oats Co., Chicago, Ill.	Blairsville, J. A. McKelvey.	1206	12.07	13.63	16.00
561	Quaker Dairy Feed with molasses, The Quaker Oats Co., Chicago, Ill.	Vintage, Paradise Farmers' Ass'n, Inc.	561	12.60	16.09	16.00
221	Quaker Dairy Feed with molasses, The Quaker Oats Co., Chicago, Ill.	Avon, Carl Z. Weiss, ..	221	14.29	16.96	16.00
241	Quaker Dairy Feed with molasses, The Quaker Oats Co., Chicago, Ill.	Reading, Aug. C. Werts & Bro.	241	9.79	17.19	16.00
		Average,		11.70	16.06	.....
866	Purina Dairy Feed, Ralston Purina Co., St. Louis, Mo.	New Castle, City Roller Mills.	866	12.55	16.51	16.50
567	Purina Dairy Feed, Ralston Purina Co., St. Louis, Mo.	Irwin, T. F. Willson,	567	11.03	17.26	16.50
		Average,		11.99	16.89	.....
674	Purina Cow Chow Feed, Ralston Purina Co., St. Louis, Mo.	Williamsport, Gohl & King.	674	13.21	25.99	24.00
473	Purina Dairy Feed, Ralston Purina Co., St. Louis, Mo.	Beaver Falls, John G. Allen.	473	12.75	20.56	20.00
160	Purina Dairy Feed, Ralston Purina Co., St. Louis, Mo.	Somerset, H. C. Beerita' Sons.	160	14.30	19.23	19.00
830	Purina Dairy Feed, Ralston Purina Co., St. Louis, Mo.	Milton, W. E. Custer, ..	830	12.49	19.81	20.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.23	Per ct. 4.00	Per ct. 12.75	Per ct. 14.50	Per ct. 1.35	Molasses, malt sprouts, cottonseed meal, ground grain screenings, clipped oat by-product and linseed meal.	Molasses, cottonseed meal, N. P. linseed oil meal, clipped oat by-product, ground and bolted grain screenings and trace of whole small weed seeds.	1134
4.20	4.00	13.08	14.50	1.35	Molasses, malt sprouts, cottonseed meal, ground grain screenings, new process linseed oil meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts.)	As certified,	1206
5.13	4.00	13.01	14.50	26.00	Molasses, malt sprouts, cottonseed meal, ground grain screenings, clipped oat by-product, linseed meal.	Molasses, malt sprouts, cottonseed meal, linseed oil meal, clipped oat by-product, ground grain screenings and small amount whole weed seeds.	561
3.96	4.00	10.04	14.50	1.20	Molasses, malt sprouts, cottonseed meal, ground grain screenings, clipped oat by-product, linseed meal.	As certified,	221
4.29	4.00	14.14	14.50	1.40	Molasses, malt sprouts, cottonseed meal, ground grain screenings, clipped oat by-product, linseed meal.	Molasses, malt sprouts, cottonseed meal, linseed oil meal, clipped oat by-product, ground grain screenings and small amount small whole weed seeds.	241
4.50	.....	11.62	.....	27.22			
4.00	3.50	12.27	12.00	28.00	Cottonseed meal, brewers' dried grains, clipped oat by-product, ground wheat screenings, molasses and 1% salt.	Cottonseed meal, brewers' dried grains, clipped oat by-product, ground wheat screenings, trace of small whole weed seeds, molasses and salt.	866
4.16	3.50	12.85	12.00	1.45	Cottonseed meal, brewers' dried grains, clipped oat by-product, ground wheat screenings, molasses and 1% salt.	Cottonseed meal, brewers' dried grains, clipped oat by-product, ground wheat screenings, trace of small whole weed seeds, molasses and salt.	597
4.08	.....	12.56	.....	28.50			
5.20	5.00	12.92	12.00	1.75	Cottonseed meal, hominy feed, brewers' dried grains, molasses, ground alfalfa and 1% salt.	As certified,	674
3.44	3.50	16.62	15.00	1.60	Cottonseed meal, brewers' dried grains, corn feed meal, ground alfalfa, molasses and 1% salt.	As certified,	473
3.52	3.50	14.66	15.00	31.00	Cottonseed meal, brewers' dried grains, corn feed meal, ground alfalfa, molasses and 1% salt.	As certified,	160
3.85	3.80	16.34	15.00	1.60	Cottonseed meal, brewers' dried grains, corn feed meal, ground alfalfa, molasses and 1% salt.	As certified,	830

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Pound.	Guaranteed.
372	Purina Dairy Feed, Ralston Purina Co., St. Louis, Mo.	Bradford, L. A. Fisher & Co.	372	Per ct. 8.90	Per ct. 24.81	Per ct. 20.00
675	Purina Dairy Feed, Ralston Purina Co., St. Louis, Mo.	Williamsport, Gohl & King.	675	14.61	22.02	20.00
380	Purina Dairy Feed, Ralston Purina Co., St. Louis, Mo.	Smethport, Herzog Milling Co.	380	13.54	20.92	20.00
765	Purina Dairy Feed, Ralston Purina Co., St. Louis, Mo.	Titusville, Kerr Hill Mill Co., Ltd.	765	12.09	22.96	20.00
281	Purina Dairy Feed, Ralston Purina Co., St. Louis, Mo.	Latrobe, Latrobe Feed Supply Co.	281	14.56	20.87	20.00
1221	Purina Dairy Feed, Ralston Purina Co., St. Louis, Mo.	Linesville, Linesville Milling Co.	1221	8.93	23.31	20.00
806	Purina Dairy Feed, Ralston Purina Co., St. Louis, Mo.	Reynoldsville, Patton & Laugherty.	806	12.51	22.64	20.00
1237	Purina Dairy Feed, Ralston Purina Co., St. Louis, Mo.	Wesleyville, W. D. Ripley	1237	12.66	22.46	20.00
1162	Purina Dairy Feed, Ralston Purina Co., St. Louis, Mo.	Derry, L. A. Wheeler, ..	1162	12.12	22.01	20.00
563	Purina Dairy Feed, Ralston Purina Co., St. Louis, Mo.	Irwin, T. F. Wilson,	563	11.83	22.00	20.00
		Average,		12.63	21.83	.....
845	Sugarine Dairy Feed, The Sugarine Co., Peoria, Ill.	Lewisburg, Buffalo Flour Milling Co.	845	8.70	17.69	16.50
783	Sugarine Dairy Feed, The Sugarine Co., Peoria, Ill.	Spartansburg, Davis & Hyde.	783	10.01	18.31	16.50
26	Sugarine Dairy Feed, The Sugarine Co., Peoria, Ill.	Hanover C. E. Miller, .	26	10.43	17.44	16.50
		Average,		9.70	17.61	.....

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.21	Per ct. 3.80	Per ct. 12.59	Per ct. 15.00	Per ct. 30.00	Cottonseed meal, brewers' dried grains, corn feed meal, ground alfalfa, molasses and 1% salt.	As certified,	372
4.04	3.80	15.54	15.00	1.85	Cottonseed meal, brewers' dried grains, corn feed meal, ground alfalfa, molasses and 1% salt.	As certified,	675
4.18	3.80	15.91	15.00	1.65	Cottonseed meal, brewers' dried grains, corn feed meal, ground alfalfa, molasses and 1% salt.	As certified,	390
3.90	3.80	16.61	15.00	1.50	Cottonseed meal, brewers' dried grains, corn feed meal, ground alfalfa, molasses and 1% salt.	As certified,	765
3.64	3.80	14.98	16.00	30.00	Cottonseed meal, brewers' dried grains, corn feed meal, ground alfalfa, molasses and 1% salt.	As certified,	231
3.71	3.80	16.01	15.00	1.50	Cottonseed meal, brewers' dried grains, corn feed meal, ground alfalfa, molasses and 1% salt.	As certified,	1221
4.23	3.80	14.47	15.00	1.75	Cottonseed meal, brewers' dried grains, corn feed meal, ground alfalfa, molasses and 1% salt.	As certified,	806
3.84	3.80	15.12	15.00	1.45	Cottonseed meal, brewers' dried grains, corn feed meal, ground alfalfa, molasses and 1% salt.	As certified,	1237
3.43	3.80	15.38	15.00	1.55	Cottonseed meal, brewers' dried grains, corn feed meal, ground alfalfa, molasses and 1% salt.	As certified,	1162
4.28	3.80	16.12	15.00	1.65	Cottonseed meal, brewers' dried grains, corn feed meal, ground alfalfa, molasses and 1% salt.	As certified,	565
3.90	.. .. .	15.56	.....	31.46			
5.23	3.50	12.30	12.00	27.00	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	As certified,	845
4.36	3.50	11.98	12.00	27.00	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	As certified,	793
4.67	3.50	11.52	12.00	27.00	Molasses, cottonseed meal, corn gluten feed, ground and bolted grain screenings, clipped oat by-product, linseed meal and salt.	As certified,	38
4.76	.....	12.26	.....	27.00			

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Crude Protein.		
				Moisture.	Found.	Guaranteed.
139	Hammond Dairy Feed, The Western Grain Products Co., Hammond, Ind.	Johnstown, G. Bostert & Son.	139	Per ct. 13.33	Per ct. 17.63	Per ct. 16.50
622	Hammond Dairy Feed, The Western Grain Products Co., Hammond, Ind.	Danville, Danville Milling Co.	622	8.97	18.12	16.50
219	Hammond Dairy Feed, The Western Grain Products Co., Hammond, Ind.	Palmyra, Early & Detweiler.	219	10.37	16.83	16.50
373	Hammond Dairy Feed, The Western Grain Products Co., Hammond, Ind.	Bradford, L. A. Fischer & Co.	373	8.73	17.83	16.50
1259	Hammond Dairy Feed, The Western Grain Products Co., Hammond, Ind.	Hays, John Lachman & Co.	1259	9.87	17.56	16.50
85	Hammond Dairy Feed, The Western Grain Products Co., Hammond, Ind.	Manheim, Lancaster Co. Farmers' Ass'n.	85	13.90	15.62	16.50
923	Hammond Dairy Feed, The Western Grain Products Co., Hammond, Ind.	Canton, Preston Bros., ..	923	10.43	17.81	16.50
1235	Hammond Dairy Feed, The Western Grain Products Co., Hammond, Ind.	Westerville, W. D. Ripley.	1235	13.69	15.69	16.50

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.61	Per ct. 3.50	Per ct. 11.91	Per ct. 11.00	Per ct. 23.00	Cottonseed meal, distillers' grains, malt sprouts, mixed broken grain separated from wheat, rye, oats and barley and wheat screenings, molasses and 3/10 of 1% salt.	As certified,	139
4.28	3.50	11.40	11.00	1.35	Cottonseed meal, distillers' grains, malt sprouts, mixed broken grain separated from wheat, rye, oats and barley and wheat screenings, molasses and 3/10 of 1% salt.	Cottonseed meal, distillers' dried grains, malt sprouts, mixed broken grains of wheat, rye, oats, barley from wheat screenings, clipped oat by-product, small amount small whole weed seeds, molasses and salt.	522
4.28	3.50	12.57	11.00	1.30	Cottonseed meal, distillers' grains, malt sprouts, mixed broken grain separated from wheat, rye, oats and barley and wheat screenings, molasses and 3/10 of 1% salt.	Cottonseed meal, distillers' dried grains, malt sprouts, mixed broken grains of wheat, rye, oats, barley from wheat screenings, trace of whole small weed seeds, molasses and salt.	219
4.15	3.50	11.59	11.00	25.00	Cottonseed meal, distillers' grains, malt sprouts, mixed broken grain separated from wheat, rye, oats and barley and wheat screenings, molasses and 3/10 of 1% salt.	Cottonseed meal distillers' dried grains, malt sprouts, mixed broken grains of wheat, rye, oats, barley from wheat screenings, small amount of small whole weed seeds, molasses and salt.	373
5.27	3.50	11.88	11.00	1.35	Cottonseed meal, distillers' grains, malt sprouts, ground and bolted mixed broken grains separated from wheat, rye, oats, barley and wheat screenings and molasses and salt.	Cottonseed meal, distillers' dried grains, malt sprouts, mixed broken grains of wheat, rye, oats, barley from wheat screenings, small amount of small whole weed seeds, molasses and salt.	1259
4.29	3.50	12.55	11.00	25.00	Cottonseed meal, distillers' grains, malt sprouts, mixed broken grain separated from wheat, rye, oats and barley and wheat screenings, molasses and 3/10 of 1% salt.	As certified,	85
4.22	3.50	12.76	11.00	1.30	Cottonseed meal, distillers' grains, malt sprouts, ground and bolted mixed broken grains separated from wheat, rye, oats, barley and wheat screenings, molasses and salt.	Cottonseed meal, distillers' dried grains, malt sprouts, clipped oat by-product, ground and bolted wheat, rye, oats and barley from wheat screenings, molasses and salt.	923
4.61	3.50	12.27	11.00	1.30	Cottonseed meal, distillers' grains, malt sprouts, ground and bolted mixed broken grains separated from wheat screenings and molasses and salt.	Cottonseed meal, distillers' dried grains, malt sprouts, ground and bolted wheat screenings, small amount small whole weed seeds, molasses and salt.	1296

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
497	Hammond Dairy Feed, The Western Grain Products Co., Hammond, Ind.	Rochester, Rochester Seed & Supply Co.	497	Per ct. 12.31	Per ct. 16.48	Per ct. 16.50
485	Hammond Dairy Feed, The Western Grain Products Co., Hammond, Ind.	New Brighton, M. H. Stager.	485	12.49	15.34	16.50
205	Hammond Dairy Feed, The Western Grain Products Co., Hammond, Ind.	Lebanon, E. Strickler's Sons.	205	9.12	16.31	16.50
31	Hammond Dairy Feed, The Western Grain Products Co., Hammond, Ind.	Hanover, W. J. Young & Co.	31	12.35	17.34	16.50
		Average, .....	.....	11.37	16.37	.....
	PROPRIETARY STOCK HORSE AND MULE FEEDS.					
153	Acme Stock Feed, Acme-Evans Co., Indianapolis, Ind.	Somerset, John G. Emert,	153	9.36	9.38	8.57
414	Acme Feed, Acme Milling Co., Olean, N. Y.	Coudersport, Gates Bros.,	414	9.91	9.06	7.00
650	Acme Feed, Acme Milling Co., Olean, N. Y.	Ridgway, Smith Bros. Co.,	650	12.12	9.22	7.00
		Average, .....	.....	11.01	9.22	.....
307	Portage Stock Feed, The Akron Feed & Milling Co., Akron, Ohio.	Mt. Pleasant, J. H. Brown & Son.	307	8.15	9.06	10.00
132	Portage Stock Feed, The Akron Feed & Milling Co., Akron, Ohio.	South Fork, J. E. Crisman	132	8.20	9.13	10.00
188	Portage Stock Feed, The Akron Feed & Milling Co., Akron, Ohio.	Bedford, N. M. & O. R. Diehl.	188	9.78	9.38	10.00
155	Portage Stock Feed, The Akron Feed & Milling Co., Akron, Ohio.	Somerset, John G. Emert,	155	8.12	9.56	10.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 3.91	Per ct. 3.50	Per ct. 13.33	Per ct. 11.00	Per ct. 1.35	Cottonseed meal, distillers' grains, malt sprouts, ground and bolted mixed broken grains separated from wheat, rye, oats and barley and wheat screenings, molasses and salt.	As certified,	497
4.10	3.50	10.06	11.00	1.25	Cottonseed meal, distillers' grains, malt sprouts, mixed broken grain separated from wheat, rye, oats and barley and wheat screenings, molasses and 3/10 of 1% salt.	Cottonseed meal, distillers' dried grains, mixed broken grains of wheat, rye, oats, barley from wheat screenings, small amount small whole weed seeds, molasses and salt.	485
3.76	2.50	15.37	11.00	1.40	Cottonseed meal, distillers' grains, malt sprouts, mixed broken grain separated from wheat, rye, oats and barley and wheat screenings, molasses and 3/10 of 1% salt.	Cottonseed meal, distillers' dried grains, mixed broken grains of wheat, rye, oats, barley from wheat screenings, trace small whole weed seeds, molasses and salt.	205
4.44	3.50	12.06	11.00	27.00	Cottonseed meal, distillers' grains, malt sprouts, mixed broken grain separated from wheat, rye, oats and barley and wheat screenings, molasses and 3/10 of 1% salt.	As certified,	81
4.23	.....	12.31	.....	26.42			
4.14	2.30	12.17	14.35	1.60	White and yellow shelled corn, oats, barley, oat shorts, oat hulls and oat middlings.	As certified,	153
4.10	3.00	6.83	9.00	1.65	Corn, hominy, oat hulls, and 1/2 of 1 per cent. salt.	As certified,	414
3.86	3.00	4.61	9.00	1.90	Corn, hominy, oat hulls, and 1/2 of 1 per cent. salt.	As certified,	650
3.98	.....	5.72	.....	1.78			
5.54	4.00	11.79	9.00	1.60	White or yellow shelled corn, barley, oat shorts, oat hulls, oat middlings and 1/2 of 1 per cent. salt.	Shelled corn, oat shorts, oat hulls, oat middlings and salt.	307
4.51	4.00	12.78	9.00	20.00	White or yellow shelled corn, barley, oat shorts, oat hulls, oat middlings and 1/2 of 1 per cent. salt.	As certified,	122
2.61	4.00	10.90	9.00	1.55	White or yellow shelled corn, barley, oat shorts, oat hulls, oat middlings and 1/2 of 1 per cent. salt.	As certified,	188
4.33	4.00	12.34	9.00	1.60	White or yellow shelled corn, barley, oat shorts, oat hulls, oat middlings and 1/2 of 1 per cent. salt.	As certified,	156

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.		
					Found.	Guaranteed.	
992	Portage Stock Feed, The Akron Feed & Milling Co., Akron, Ohio.	Washington, C. S. Hunter Co.	992	Per ct. 9.35	Per ct. 9.06	Per ct. 10.00	
794	Portage Stock Feed, The Akron Feed & Milling Co., Akron, Ohio.	Punxsutawney, Jefferson Flour & Feed Co.	794	8.08	10.00	10.00	
1104	Portage Stock Feed, The Akron Feed & Milling Co., Akron, Ohio.	Jeannette, Keystone Supply Co.	1104	8.42	9.06	10.00	
185	Portage Stock Feed, The Akron Feed & Milling Co., Akron, Ohio.	Bedford, H. H. Lysinger,	185	8.54	9.21	10.00	
1236	Portage Stock Feed, The Akron Feed & Milling Co., Akron, Ohio.	Wesleyville, W. D. Ripley.	1236	7.83	8.75	10.00	
1094	Portage Stock Feed, The Akron Feed & Milling Co., Akron, Ohio.	Farrell, J. B. Roux, ..	1094	8.33	12.00	10.00	
1243	Portage Stock Feed, The Akron Feed & Milling Co., Akron, Ohio.	Belle Valley, Schrimper Brothers.	1243	7.73	9.00	10.00	
692	Portage Stock Feed, The Akron Feed & Milling Co., Akron, Ohio.	Tyrone, Tyrone Milling Co.	692	7.42	10.12	10.00	
1157	Portage Stock Feed, The Akron Feed & Milling Co., Akron, Ohio.	Derry, L. A. Wheeler, .	1157	8.32	8.50	10.00	
		Average,		8.33	9.46	.....
565	Altman's Alfalfa Horse Feed, Hiram Altman & Son, Manor, Pa.	Manor, Hiram Altman & Son.	565	12.36	11.56	10.00	
946	Dairy Feed, Altoona Mills, Altoona, Pa.	Altoona, Altoona Feed Mills	946	11.31	10.06	7.00	
945	Horse Chop, Altoona Mills, Altoona, Pa.	Altoona, Altoona Feed Mills	945	10.59	12.12	7.00	
952	Acme Horse Chop, T. M. Biddle, Altoona, Pa.	Altoona, T. M. Biddle, ..	952	10.56	12.44	8.00	
944	Acme Horse Chop, T. M. Biddle, Altoona, Pa.	Juniata, R. J. Remaley,	944	10.06	12.69	8.00	
		Average,		10.31	12.57	.....
512	Ublko Horse & Stock Feed, The J. W. Biles Co., Cincinnati, Ohio.	Sunbury, Flank & Gottshall,	512	8.62	18.38	11.00	
509	Horse Feed, Blank & Gottshall, Sunbury, Pa.	Sunbury, Blank & Gottshall,	509	10.08	11.63	11.12	

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.73	Per ct. 4.00	Per ct. 9.03	Per ct. 9.00	Per ct. 5.75	White or yellow shelled corn, barley, oat shorts, oat hulls, oat middlings and $\frac{1}{2}$ of 1 per cent. salt.	Shelled corn, oat shorts, oat hulls, oat middlings and salt.	992
6.12	4.00	9.59	9.00	.....	White or yellow shelled corn, barley, oat shorts, oat hulls, oat middlings and $\frac{1}{2}$ of 1 per cent. salt.	Shelled corn, oat shorts, oat hulls, oat middlings and salt.	794
4.56	4.00	9.57	9.00	33.00	White or yellow shelled corn, barley, oat shorts, oat hulls, oat middlings and $\frac{1}{2}$ of 1 per cent. salt.	Shelled corn, oat shorts, oat hulls, oat middlings and salt.	1104
5.40	4.00	11.13	9.00	1.60	White or yellow shelled corn, barley, oat shorts, oat hulls, oat middlings and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	185
3.36	4.00	14.37	9.00	1.45	White or yellow shelled corn, barley, oat shorts, oat hulls, oat middlings and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	1236
6.17	4.00	9.02	9.00	1.55	White or yellow shelled corn, barley, oat shorts, oat hulls, oat middlings and $\frac{1}{2}$ of 1 per cent. salt.	Shelled corn, oat shorts, oat hulls, oat middlings and salt.	1001
5.20	4.00	13.27	9.00	23.00	White or yellow shelled corn, barley, oat shorts, oat hulls, oat middlings and $\frac{1}{2}$ of 1 per cent. salt.	Shelled corn, oat shorts, oat hulls, oat middlings and salt.	1213
6.53	4.00	10.37	9.00	1.60	White or yellow shelled corn, barley, oat shorts, oat hulls, oat middlings and $\frac{1}{2}$ of 1 per cent. salt.	Shelled corn, oat shorts, oat hulls, oat middlings and salt.	692
3.69	4.00	14.77	10.00	29.00	White or yellow shelled corn, barley, oat shorts, oat hulls, oat middlings and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	1157
4.96	.....	11.45	.....	31.17			
4.66	2.00	6.07	12.00	1.75	Dustless alfalfa, cracked oats, cracked corn, bran and oil meal.	As certified,	565
3.43	3.00	5.98	9.00	37.00	Corn, oat middlings, oat hulls and barley.	As certified,	946
4.04	3.00	6.00	9.00	37.00	Oat middlings, oat hulls, hominy, rye middlings, rye and wheat bran.	As certified,	945
6.26	3.00	5.56	9.00	35.00	Rye, oats, corn, rye middlings and hominy feed.	As certified,	952
6.76	3.00	6.06	9.00	1.90	Rye, oats, corn, rye middlings and wheat middlings.	As certified,	944
6.51	.....	5.80	.....	36.50			
6.46	6.00	7.81	9.00	34.50	Wheat middlings, hominy meal, wheat bran, brewers' dried grains and old process linseed meal.	As certified,	512
4.96	4-5	5.07	4-5.5	33.00	Rollod oats, barley, rye and corn.	As certified,	500

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Crude Protein.		
				Moisture.	Found.	Guaranteed.
1000	No. 1 Bake Stock Feed, The Canton Feed & Milling Co., Canton, Ohio.	Houston, W. M. Templeton & Sons.	1000	Per ct. 6.95	Per ct. 12.75	Per ct. 12.00
627	Corn, Oats and Barley Feed, The Chesbro Milling Co., Salamanca, N. Y.	DuBois, A. T. Sprankle,	627	10.02	8.56	8-10
962	E. D. Clark's Superior Horse Chop, E. D. Clark, Altoona, Pa.	Altoona, H. H. Langdon,	962	9.75	11.75	8-10
874	White Cross Stock Feed, The Albert Dickinson Co., Chicago, Ill.	New Castle, Fisher & Mengle.	874	10.82	10.44	10.00
396	Emporium Feed, Emporium Milling Co., Emporium, Pa.	Emporium, Emporium Milling Co.	396	9.46	9.56	7.53
70	Stock Feed, John W. Eschelman, Lancaster, Pa.	Lancaster, John W. Eschelman.	70	9.75	12.75	10.00
1125	Stock Feed, John W. Eschelman, Lancaster, Pa.	Coatesville, Handwork Brothers.	1125	8.28	11.33	10.00
		Average, .....	.....	9.00	12.07	.....
428	Buffalo Stock Feed, Globe Elevator Co., Buffalo, N. Y.	Westfield, Frank A. Ackley.	428	9.88	10.94	9-10
123	Buffalo Stock Feed, Globe Elevator Co., Buffalo, N. Y.	Patton, James Commons & Son.	123	11.22	10.44	9-10
638	Buffalo Stock Feed, Globe Elevator Co., Buffalo, N. Y.	St. Marys, Hall, Kaul & Hyde Co.	638	11.45	11.56	9-10
790	Buffalo Stock Feed, Globe Elevator Co., Buffalo, N. Y.	Lindsey, Lindsey Milling Co.	790	10.58	11.06	9-10
		Average, .....	.....	10.30	11.00	.....
1153	Soft Feed, Godfrey Schmidheiser & Co., Philadelphia, Pa.	Philadelphia, Godfrey Schmidheiser & Co.	1153	10.99	10.44	6-8
1155	S. & S. Horse Feed, Godfrey Schmidheiser & Co., Philadelphia, Pa.	Philadelphia, Godfrey Schmidheiser & Co.	1155	11.06	11.37	7-10
1035	Star Mixed Feed, Hazleton Mercantile Co., Hazleton, Pa.	Hazleton Hazleton Mercantile Co.	1035	10.40	9.2	8-10

FEEDING STUFFS COLLECTED IN 1915.—Continued

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 5.00	Per ct. 5.00	Per ct. 12.33	Per ct. 9.00	Per ct. 1.60	Corn products, oat feed, oat middlings and kiln dried stock salt.	Corn oil meal, oat middlings, oat hulls and salt.	1000
3.93	4-6	9.36	8-10	1.70	Corn, hominy, barley, oat shorts, oat hulls, oat middlings and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	627
6.81	3.5-4.5	4.73	7-9	1.85	Oats, hominy feed, rye middlings and reddog flour.	As certified,	963
5.11	3.50	4.64	10.00	1.65	Ground oats, ground barley, corn feed meal, wheat meal, ground corn bran, cottonseed meal and salt $\frac{1}{2}$ of 1 per cent.	As certified,	874
4.96	2.97	8.40	9.00	1.75	Corn, hominy, oats, oat hulls and oat middlings.	As certified,	306
4.19	3.00	11.58	10.00	28.00	Wheat middlings, rye middlings, oat middlings, ground oats, reground oat hulls, hominy feed, corn meal, salt and linseed meal.	As certified,	70
5.90	3.00	7.37	9.00	23.00	Oat feed, cottonseed meal, ground grain screenings, wheat middlings, rye middlings, corn meal and hominy feed.	As certified,	1126
5.00	.....	9.47	.....	30.50			
4.19	4-6	7.63	9.00	1.65	Corn, barley, oats, reddog flour, oat hulls, oat middlings, hominy feed, cottonseed meal and salt $\frac{1}{2}$ of 1 per cent.	Corn, oats, oat hulls, oat middlings, red dog flour, hominy feed, cottonseed meal and salt.	428
4.29	4-6	8.16	9.00	1.75	Corn, barley, oats, reddog flour, oat hulls, oat middlings, hominy feed, cottonseed meal and salt $\frac{1}{2}$ of 1 per cent.	Corn, oats, oat hulls, oat middlings, red dog flour, hominy feed, cottonseed meal and salt.	113
4.28	4-6	6.23	9.00	1.80	Corn, barley, oats, reddog flour, oat hulls, oat middlings, hominy feed, cottonseed meal and salt $\frac{1}{2}$ of 1 per cent.	Corn, oats, oat hulls, oat middlings, red dog flour, hominy feed, cottonseed meal and salt.	635
4.36	4-6	6.69	9.00	1.75	Corn, barley, oats, reddog flour, oat hulls, oat middlings, hominy feed, cottonseed meal and salt $\frac{1}{2}$ of 1 per cent.	Corn, oats, oat hulls, oat middlings, red dog flour, hominy feed, cottonseed meal and salt.	790
4.28	.....	7.19	.....	1.74			
4.57	2-4	8.51	25-35	1.60	Cracked corn, bran and cut hay.	Cracked corn, wheat bran, cut hay and trace whole weed seeds.	1153
4.90	2-4	4.05	8-12	32.00	Cracked corn, crushed oats and wheat bran.	As certified,	1155
6.37	6-7	7.14	7-9	1.35	Hominy feed, ground corn cob, oat hulls and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	1085

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
531	Heck's Gypsy Horse Feed, Francis Heck, Shamokin, Pa.	Shamokin, Francis Heck,	531	Per ct. 10.84	Per ct. 13.38	Per ct. 10-12
948	Horse Chop, Klepser Brothers, Martinsburg, Pa.	Altoona, Klepser Brothers,	948	10.00	13.56	7.00
938	Badger Stock Feed, Charles A. Krause Milling Co., Milwaukee, Wis.	Troy, Farmers' & Consumers' Commercial Union.	938	8.92	9.56	10.00
212	Badger Stock Feed, Charles A. Krause Milling Co., Milwaukee, Wis.	Palmyra, J. H. Kettering & Son.	212	8.26	10.81	10.00
224	Badger Stock Feed, Charles A. Krause Milling Co., Milwaukee, Wis.	Avon, Charles Z. Weiss, ..	224	9.56	11.00	10.00
		Average,		8.92	10.46	.....
1017	Best Mixed Feed for Horses, C. P. Matthews & Sons, Inc., Scranton, Pa.	Wilkes-Barre, C. P. Matthews & Sons, Inc.	1017	10.82	12.56	9-10
1085	Best Mixed Feed for Horses, C. P. Matthews & Sons, Inc., Scranton, Pa.	Scranton, C. P. Matthews & Sons, Inc.	1085	10.07	12.41	9-10
		Average,		10.44	12.50	.....
833	McMahan's Prepared Horse Feed, C. H. McMahan, Milton, Pa.	Milton, O. H. McMahan,	833	8.49	21.38	13-20
1083	Mixed Feed, C. P. Matthews & Sons, Inc., Scranton, Pa.	Scranton, C. P. Matthews & Sons, Inc.	1083	8.91	12.75	7-9
1084	Mixed Feed, C. P. Matthews & Sons, Inc., Scranton, Pa.	Scranton, C. P. Matthews & Sons, Inc.	1084	10.12	12.19	7-9
		Average,		9.52	12.47	.....
1030	Milhimico Stock Feed, Miner-Hillard Milling Co., Wilkes-Barre, Pa.	Wilkes-Barre Miner-Hillard Milling Co.	1030	9.15	12.23	12-15
1075	Milhimico Stock Feed, Miner-Hillard Milling Co., Wilkes-Barre, Pa.	Scranton, Miner-Hillard Milling Co.	1075	10.06	10.81	11-15
		Average,		9.60	11.60	.....
817	Challenge Stock Feed, New-some Feed & Grain Co., Pittsburgh, Pa.	Carnegie, Carnegie Feed & Supply Co.	817	9.34	10.88	10.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.09	Per ct. 2-3	Per ct. 8.67	Per ct. 15-18	Per ct. 1.75	Wheat bran, corn bran, cracked corn, rye bran and alfalfa.	Wheat bran, corn bran, cracked corn, rye bran, alfalfa and trace ground screenings.	531
6.77	3.00	4.40	7-9	1.85	Hominy, rye middlings and wheat middlings.	As certified,	948
5.06	4.50	12.37	9.00	1.80	Hominy feed, maize corn oil meal, maize reddog flour, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and salt.	As certified,	938
5.91	4.50	8.91	9.00	32.00	Hominy feed, maize corn oil meal, maize reddog flour, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and salt.	As certified,	212
5.50	4.50	9.62	9.00	1.55	Hominy feed, maize corn oil meal, maize reddog flour, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and salt.	As certified,	224
5.49	.....	10.30	.....	31.67	Corn, oats, wheat middlings and linseed meal.	As certified,	1017
5.55	2-4	5.16	6-7	38.00		As certified,	1065
5.48	2-4	4.87	6-7	1.90	Corn, oats, wheat middlings and linseed meal.	As certified,	1080
5.52	.....	5.01	.....	38.00	Brewers' dried grains, hominy meal, cottonseed meal and middlings.	As certified,	833
7.46	7-8	8.87	9-10	32.00		As certified,	1083
8.58	4-6	4.89	5-6	1.85	Hominy, corn and oat feed.	Corn, hominy feed, oat middlings and oat hulls.	1084
7.11	4-6	4.17	5-6	1.85	Hominy, corn and oat feed.	Corn, hominy feed, oat middlings and oat hulls.	1080
7.82	.....	4.53	.....	1.85	Alfalfa, hominy feed, wheat middlings, rye middlings, corn, oats, corn oil meal and salt.	As certified,	1075
5.34	5-7	7.81	8-10	1.90		As certified,	1075
4.13	5-7	5.23	8-10	1.90	Alfalfa, hominy feed, middlings, corn, oats, corn oil meal and salt.	As certified,	1075
4.74	.....	6.52	.....	1.90	Hominy feed, maize corn oil meal, maize red dog flour, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and salt.	As certified,	1017
5.66	4.50	8.57	9.00	1.75		As certified,	1017

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
				Per ct.	Per ct.	Per ct.
319	Challenge Stock Feed, New-some Feed & Grain Co., Pittsburgh, Pa.	Scottdale, City Feed Store	319	9.83	10.19	10.00
334	Challenge Stock Feed, New-some Feed & Grain Co., Pittsburgh, Pa.	New Salem, Mike Duyava,	334	9.98	10.00	10.00
585	Challenge Stock Feed, New-some Feed & Grain Co., Pittsburgh, Pa.	Kittanning, William Gates, Est.	585	8.46	11.25	10.00
276	Challenge Stock Feed, New-some Feed & Grain Co., Pittsburgh, Pa.	Greensburg, Hudson & Kuhns.	276	9.76	11.00	10.00
327	Challenge Stock Feed, New-some Feed & Grain Co., Pittsburgh, Pa.	Uniontown, King Brothers	327	9.35	10.31	10.00
581	Challenge Stock Feed, New-some Feed & Grain Co., Pittsburgh, Pa.	Kittanning, L. Pollock,	581	8.39	10.25	10.00
		Average, .....	.....	9.30	10.55	.....
712	Buffalo Horse Feed, A. Nowak & Son, Buffalo, N. Y.	Yeagertown, J. M. Yeager	712	8.89	9.69	7.00
709	Justice Brand Scientific Stock Feed, A. Nowak & Son, Buffalo, N. Y.	Yeagertown, J. M. Yeager	709	8.72	9.44	10.00
1218	Challenge Stock Feed, The D. H. Owen Co., Youngstown, Ohio.	Linesville, Linesville Milling Co.	1218	7.25	9.63	10.00
342	Economy Feed, Perry & Henderson, Connellsville, Pa.	Connellsville, Perry & Henderson.	342	10.88	12.00	8.00
356	Pioneer Stock Feed, The Pioneer Cereal Co., Akron, Ohio.	Morrisdale, Morrisdale Feed & Grain Co.	356	9.40	9.00	9.10

FEEDING STUFFS COLLECTED IN 1915 —Continued

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 6.04	Per ct. 4.50	Per ct. 9.62	Per ct. 9.00	Per ct. 1.75	Hominy feed, maize corn oil meal, maize red dog flour, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and salt.	As certified,	319
5.36	4.50	9.02	9.00	1.65	Hominy feed, maize corn oil meal, maize red dog flour, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and salt.	As certified,	334
6.00	4.50	8.91	9.00	1.00	Hominy feed, maize corn oil meal, maize red dog flour, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and salt.	As certified,	585
5.94	4.50	9.23	9.00	32.00	Hominy feed, maize corn oil meal, maize red dog flour, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and salt.	As certified,	276
5.67	4.50	10.10	9.00	1.75	Hominy feed, maize corn oil meal, maize red dog flour, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and salt.	As certified,	327
5.85	4.50	10.68	9.00	1.65	Hominy feed, maize corn oil meal, maize red dog flour, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and salt.	As certified,	581
5.79	.....	9.44	.....	33.57	.....	.....	.....
4.06	3.00	11.72	12.00	1.85	Ground oats, corn feed meal, hominy feed, oat hulls, clipped oat by-product containing some seeds, wheat middlings and $\frac{1}{2}$ of 1 per cent. salt.	Ground oats, corn feed meal, hominy feed, oat hulls, clipped oat by-product, wheat middlings, trace whole weed seeds and salt.	712
4.25	3.00	12.04	9.00	1.85	Ground oats, corn feed meal, linseed oil meal, wheat middlings, oat middlings, oat hulls, clipped oat by-product containing some seeds and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	709
6.10	4.00	11.12	9.00	1.55	Either white or yellow shelled corn, barley, oat shorts, oat hulls, oat middlings, and $\frac{1}{2}$ of 1 per cent. salt.	Shelled corn, oat shorts, oat middlings, oat hulls and salt.	1218
4.56	4.00	6.62	9.00	1.70	Corn, ear corn, oat feed and barley.	Corn, ear corn, rye, barley, wheat, oat middlings, oat hulls, small amount ground screenings and small whole weed seeds.	342
4.20	4-6	7.40	9.00	1.80	Shelled corn, barley, oat shorts, oat hulls and oat middlings and seasoned with $\frac{1}{2}$ of 1 per cent. salt.	As certified,	356

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
164	Pioneer Stock Feed, The Pioneer Cereal Co., Akron, Ohio.	Windber, L. B. Reeser & Co.	164	Per ct. 8.43	Per ct. 9.31	Per ct. 8.10
		Average,		8.91	9.19	.....
673	Boss Feed, The Quaker Oats Co., Chicago, Ill.	Williamsport, Gohl & King.	673	8.54	9.50	8.00
206	Boss Feed, The Quaker Oats Co., Chicago, Ill.	Lebanon, E. Strickler's Sons.	206	10.54	8.33	8.00
		Average,		9.54	9.19	.....
360	C. O. & B. Feed, The Quaker Oats Co., Chicago, Ill.	Osceola Mills, Baird, Rickenbaugh & Co.	360	9.84	11.00	10.00
592	C. O. & B. Feed, The Quaker Oats Co., Chicago, Ill.	Parnassus, Johnston & Hamilton.	592	9.47	11.33	10.00
700	C. O. & B. Feed, The Quaker Oats Co., Chicago, Ill.	McVeytown, John T. Rodgers.	700	9.54	11.75	10.00
		Average,		9.61	11.33	.....
1145	Schnmacher Special Horse Feed, The Quaker Oats Co., Chicago, Ill.	West Chester, I. H. Bailey	1145	8.42	10.00	9.25

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.18	Per ct. 4-6	Per ct. 7.56	Per ct. 9.00	Per ct. 1.65	Shelled corn, barley, oat shorts, oat hulls and oat middlings seasoned with $\frac{1}{2}$ of 1 per cent. salt.	As certified,	164
4.19	.....	7.43	.....	1.73			
5.43	3.00	11.09	9.00	1.75	Ground corn, hominy feed, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	673
4.37	3.00	7.66	9.00	1.65	Ground corn, hominy feed, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	206
4.90	.....	9.37	.....	1.70			
3.90	3.25	8.92	9.00	1.85	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	360
3.92	3.25	10.00	9.00	33.00	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	592
4.06	2.25	9.66	9.00	1.75	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	700
3.96	.....	9.52	.....	35.00			
4.25	1.25	7.37	8.00	37.00	Ground corn, crushed oats, oat meal mill by-product, (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	145

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein	
					Found.	Guaranteed.
819	Schumacher Stock Feed, The Quaker Oats Co., Chicago, Ill.	Carnegie, Carnegie Feed & Supply Co.	819	Per ct. 9.85	Per ct. 11.81	Per ct. 20.60
131	Schumacher Stock Feed, The Quaker Oats Co., Chicago, Ill.	Bedford, Davidson, Bros..	131	9.94	11.60	19.00
450	Schumacher Stock Feed, The Quaker Oats Co., Chicago, Ill.	Mansfield, Equity Co-Operative Exchange.	450	8.50	11.88	19.00
248	Schumacher Stock Feed, The Quaker Oats Co., Chicago, Ill.	Fleetwood, Kaufman, Schaeffer & Co.	248	9.37	10.83	19.00
787	Schumacher Stock Feed, The Quaker Oats Co., Chicago, Ill.	Titusville, Kerr Hill Mill Co., Ltd.	787	9.24	11.21	19.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 3.75	Per ct. 3.25	Per ct. 8.84	Per ct. 9.00	Per ct. 31.00	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	819
3.50	3.25	9.20	9.00	1.60	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	181
4.84	3.25	10.16	9.00	1.65	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	450
4.53	3.25	9.92	9.00	31.00	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	248
4.39	3.25	10.21	9.00	1.75	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	767

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
1115	Schumacher Stock Feed, The Quaker Oats Co., Chicago, Ill.	Bellevue, C. N. Luce,	1115	Per ct. 8.43	Per ct. 11.25	Per ct. 10.00
876	Schumacher Stock Feed, The Quaker Oats Co., Chicago, Ill.	Mahoningtown Station, Mahoning Supply Co.	876	8.37	11.56	10.00
981	Schumacher Stock Feed, The Quaker Oats Co., Chicago, Ill.	Mt. Union, David Rummel,	981	9.25	12.00	10.00
1199	Schumacher Stock Feed, The Quaker Oats Co., Chicago, Ill.	Indiana. St. Clair, Rinn & Co.	1199	7.29	11.69	10.00
1168	Schumacher Stock Feed, The Quaker Oats Co., Chicago, Ill.	Homestead' Vallowe Bros	1168	8.27	11.67	10.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.09	Per ct. 3.25	Per ct. 9.64	Per ct. 9.00	Per ct. 1.70	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	1115
4.74	3.25	9.88	9.00	1.65	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	876
4.76	3.25	10.04	9.00	1.70	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	961
4.96	3.25	10.18	9.00	31.00	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	1199
5.21	3.25	9.27	9.00	1.60	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	1168

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
749	Schumacher Stock Feed, The Quaker Oats Co., Chicago, Ill.	Lock Haven, E. E. Wentz,	749	Per ct. 9.62	Per ct. 12.69	Per ct. 10.00
		Average, .....	.....	8.93	11.67	.....
753	Sterling Stock Feed, The Quaker Oats Co., Chicago, Ill.	Bellefonte, G. R. Danenhower & Son, Inc.	753	9.07	11.44	10.00
586	Sterling Stock Feed, The Quaker Oats Co., Chicago, Ill.	Kittanning, William Gates, Est.	586	8.88	11.69	10.00
104	Sterling Stock Feed, The Quaker Oats Co., Chicago, Ill.	Harrisburg, Mock & Hartman.	104	9.33	11.56	10.00
802	Sterling Stock Feed, The Quaker Oats Co., Chicago, Ill.	Reynoldsville, Patton & Daugherty.	802	9.53	11.44	10.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.18	Per ct. 3.25	Per ct. 9.47	Per ct. 9.00	Per ct. 1.65	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	743
4.49	.....	9.71	.....	32.64			
4.05	3.25	9.62	9.00	32.00	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	753
4.95	3.25	10.12	9.00	1.60	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	558
3.97	3.25	8.40	9.00	35.00	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	104
4.26	3.25	10.26	9.00	1.65	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	802

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
1182	Sterling Stock Feed, The Quaker Oats Co., Chicago, Ill.	Turtle Creek, F. J. Riddle	1182	Per ct. 8.09	Per ct. 11.19	Per ct. 10.00
		Average,		9.09	11.46	.....
326	Victor Feed, The Quaker Oats Co., Chicago, Ill.	Uniontown, King Bros., ..	326	10.47	9.88	8.00
225	Victor Feed, The Quaker Oats Co., Chicago, Ill.	Avon, Charles Z. Weiss, ..	225	11.07	9.17	8.00
		Average,		10.77	9.28	.....
492	White Diamond Feed, The Quaker Oats Co., Chicago, Ill.	West Bridgewater, W. W. McCullough.	492	9.68	9.69	8.00
858	White Diamond Feed, The Quaker Oats Co., Chicago, Ill.	New Castle, New Castle Feed Co.	858	9.40	9.25	8.00
		Average,		9.53	9.47	.....
701	Mixed Feed, John T. Rodgers, McVeytown, Pa.	McVeytown, John T. Rodgers.	701	10.59	14.69	8-10
642	Camp's Stock Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	St. Marys, Hall, Kaul & Hyde Co.	642	10.79	10.63	9-10
861	Camp's Stock Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	Munson Station, Jacob Smutzinger.	861	10.53	10.56	9-10
		Average,		10.64	10.57	.....

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.39	Per ct. 9.25	Per ct. 9.56	Per ct. 9.00	Per ct. 1.65	Ground corn, ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	1182
4.32	.....	9.61	.....	33.00			
5.28	3.00	8.20	9.00	1.75	Ground corn, hominy feed, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	328
4.57	3.00	7.17	9.00	1.50	Ground corn, hominy feed, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	225
4.93	.....	7.68	.....	1.63			
4.53	3.25	9.10	9.00	1.60	Ground corn, hominy feed, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	492
3.98	2.25	7.10	9.00	32.00	Ground corn, hominy feed, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	358
4.26	.....	8.10	.....	23.00			
6.70	2-4	6.80	14-16	1.70	Hominy feed, wheat bran and wheat middlings with ground screenings not exceeding mill run.	As certified,	701
3.88	3.5-4	8.83	8-9	1.85	White or yellow corn, oats, barley, corn siftings, wheat middlings, cottonseed meal, oat hulls, oat middlings, oat groats and $\frac{1}{2}$ of 1 per cent. salt.	Corn, oats, corn siftings, wheat middlings, cottonseed meal, oat hulls, oat middlings, oat groats and salt.	642
4.20	2.5-4	9.59	8-9	1.75	White or yellow corn, oats, barley, wheat middlings, cottonseed meal, corn meal mill by-product (fine meal and siftings) oat meal mill by-product (oat middlings, oat hulls, oat groats) and $\frac{1}{2}$ of 1 per cent. salt.	Corn, oats, corn siftings, wheat middlings, cottonseed meal, oat hulls, oat middlings, oat groats and salt.	361
4.04	.....	9.21	.....	1.80			

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.		
					Found.	Guaranteed.	
1088	Ubiko Horse and Stock Feed, The Ubiko Milling Co., Cincinnati, Ohio.	Greenville, Webber Bros.,	1088	Per ct. 8.80	Per ct. 20.56	Per ct. 16.00	
1263	Otto Weiss Stock Feed, The Otto Weiss Alfalfa Stock Food Co., Wichita, Kans.	Pittsburgh, C. J. Cleland,	1263	9.95	12.75	11.00	
830	Otto Weiss Stock Feed, The Otto Weiss Alfalfa Stock Food Co., Wichita, Kans.	Pittsburgh, The I. W. Scott Co.	830	8.97	12.38	11.00	
	PROPRIETARY STOCK, HORSE AND MULE FEEDS, WITH MOLASSES.	Average,		9.46	12.82	.....
1148	Keystone Alfalfa Feed for Horses, Alfalfa Feed Mills, Philadelphia, Pa.	Philadelphia, Charles Schaal,	1148	15.23	9.27	11.00	
1152	Leader Horse and Mule Feed, Alfocorn Milling Co., East St. Louis, Ill.	Philadelphia, Godfrey Shmidheiser & Co.	1152	14.39	9.62	9.00	
1181	Molasses Alfocorn Horse and Mule Feed, Alfocorn Milling Co., East St. Louis, Ill.	Turtle Creek, F. J. Riddle	1181	15.42	9.20	9.00	
836	Sucrene Horse Feed, American Milling Co., Peoria, Ill.	Butler, H. J. Klingler & Co.	836	15.47	8.94	9.00	
187	Sucrene Horse and Mule Feed with alfalfa, American Milling Co., Peoria, Ill.	Somerset, John G. Emert,	187	16.18	11.20	10.00	
1087	Arcady Horse Feed, Arcady Farms Milling Co., Roundout, Ill.	Greenville, Webber Bros.,	1087	16.42	9.33	9.00	
1001	Gloskoat Horse Feed, J. J. Badenoch & Co., Chicago, Ill.	Farrel, J. B. Roux,	1001	17.06	11.47	.....
1101	Gloskoat Horse Feed, J. J. Badenoch & Co., Chicago, Ill.	Sharon, Sharon Flour & Feed Co.	1101	16.96	10.61	.....
	Average,			17.00	10.99	.....
1149	Beldler's Mecca Horse Feed, H. Beldler & Co., Philadelphia, Pa.	Philadelphia, H. Beldler & Co.	1149	12.76	9.06	5-8	
1150	Beldler's No-Compaction Horse Feed, H. Beldler & Co., Philadelphia, Pa.	Philadelphia, H. Beldler & Co.	1150	12.40	10.41	5.00	
1050	Hercules Horse Feed, Bergin & Co., Nanticoke, Pa.	Nanticoke, Bergin & Co.,	1050	11.75	15.21	14-16	
953	My Best Horse Feed, T. M. Biddle, Altoona, Pa.	Altoona, T. M. Biddle, ..	953	15.06	10.12	9.00	
610	Four-A Horse Feed, The Big Four Milling Co., Cleveland, Ohio.	Oil City, Enterprise Milling Co.	610	12.00	12.71	12.50	

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 7.50	Per ct. 6.00	Per ct. 9.05	Per ct. 9.00	Per ct. 1.70	Wheat middlings, hominy meal, wheat bran, brewers' dried grains and old process linseed meal.	As certified,	1068
3.86	3.00	10.99	14.00	2.00	Alfalfa meal, corn chop, crushed oats, wheat bran and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	1263
2.60	3.00	11.92	14.00	36.00	Alfalfa meal, corn chop, crushed oats, wheat bran and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	890
3.73	.....	11.45	.....	28.00			
2.55	3.00	8.07	12.00	\$1.00	Corn, oats, barley, alfalfa, cane molasses and salt $\frac{1}{2}$ of 1 per cent.	As certified,	1143
3.53	1.50	11.38	18.00	31.00	Corn, oats, alfalfa meal, molasses and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	1152
1.94	2.00	11.32	13.50	1.75	Alfalfa meal, whole oats (crushed), whole corn (cracked), and cane molasses.	As certified,	1181
3.20	2.50	7.68	12.00	1.65	Molasses, clipped oat by-product, corn, oats and salt.	As certified,	835
2.63	2.50	12.27	12.00	1.75	Molasses, alfalfa, corn, oats, barley and salt.	As certified,	157
2.20	2.00	11.77	12.00	1.65	Cracked corn, oats, alfalfa, molasses and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	1087
2.67	.....	12.48	.....	1.60		Corn, oats, barley, alfalfa meal, molasses and salt.	1091
1.78	.....	12.47	.....	1.70		Corn, oats, barley, alfalfa meal and molasses.	1101
2.18	.....	12.47	.....	1.65			
3.24	1-2	7.59	15-20	21.00	Cracked corn, oats, alfalfa meal and molasses.	As certified,	1149
6.48	1.00	11.15	35.00	27.00	Cut hay, alfalfa meal, bran, cracked corn, rolled oats and cane molasses.	As certified,	1150
4.45	3-5	5.69	6-9	2.00	Cracked corn, corn meal, standard middlings, brewers' grains, old process oil meal, cottonseed meal, wheat bran, gluten, oats, extraviu feed, sphagnum moss and molasses, alfalfa.	As certified,	1050
3.80	1.80	6.05	20.00	35.00	Corn, oats, alfalfa and sugar beet syrup.	As certified,	953
4.01	1.00	9.91	10.00	1.80	Corn, oats, alfalfa meal, brewers' grains and molasses.	As certified,	610

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
777	Energy Horse Feed, The Buckeye Cereal Co., Massillon, Ohio.	Corry, R. H. Van Tassel,	777	Per ct. 13.91	Per ct. 12.00	Per ct. 13.00
1151	Omac Horse Feed, H. B. Cassel, Philadelphia, Pa.	Philadelphia, H. B. Cassel	1151	13.75	11.74	6-8
659	Wheelock's Horse Feed, Chesbro Milling Co., Salamanca, N. Y.	Ridgway, Charles O. Salberg.	659	16.10	10.00	10-12
5	Peerless Horse Feed, Clover Leaf Milling Co., Buffalo, N. Y.	York, Anderson Bros & Co.	5	13.35	10.69	10.00
828	Dickinson's Hobby Horse Feed, The Albert Dickinson Co., Chicago, Ill.	Midway, The D. G. Bamford Milling Co.	828	17.78	11.19	9.00
1097	Dickinson's Hobby Horse Feed, The Albert Dickinson Co., Chicago, Ill.	Sharon, J. M. Porter,	1097	15.99	11.97	9.00
		Average, .....	.....	16.88	11.53	.....
689	Dixie Horse and Mule Feed, Dixie Mills Co., East St. Louis, Ill.	Tyrone, Bayer-Gilliam Co.	689	15.84	9.95	10.00
347	Dixie Horse and Mule Feed, Dixie Mills Co., East St. Louis, Ill.	Connellsville, Dull & Co.	347	16.55	10.65	10.00
993	Dixie Horse and Mule Feed, Dixie Mills Co., East St. Louis, Ill.	Washington, C. S. Hunter Co.	993	17.17	9.32	10.00
590	Dixie Horse and Mule Feed, Dixie Mills Co., East St. Louis, Ill.	Parnassus, Johnston & Hamilton.	590	16.24	9.70	10.00
950	Dixie Horse and Mule Feed, Dixie Mills Co., East St. Louis, Ill.	Altoona, Klepser Bros., ..	950	17.01	10.65	10.00
965	Dixie Horse and Mule Feed, Dixie Mills Co., East St. Louis, Ill.	Altoona, Martin & Co., ..	965	16.84	10.78	10.00
1100	Dixie Horse and Mule Feed, Dixie Mills Co., East St. Louis, Ill.	Sharon, Sharon Flour & Feed Co.	1100	15.91	9.46	10.00
		Average, .....	.....	16.50	10.07	.....
855	Ben Hur Horse & Mule Feed, The Early & Daniel Co., Cincinnati, Ohio.	New Castle, New Castle Feed Co.	855	16.80	10.38	10.00
823	Ben Hur Horse & Mule Feed, The Early & Daniel Co., Cincinnati, Ohio.	Carnegie, Richey & Carlisle.	823	17.76	10.47	10.00
		Average, .....	.....	17.28	10.43	.....
1103	Harvest Horse Feed, Edwards & Loomis Co., Chicago, Ill.	Jeannette, Keystone Supply Co.	1103	15.74	11.63	10.00
1138	Alfalfa Horse Feed, J. W. Eshelman, Lancaster, Pa.	Downingtown, H. C. Clarkson.	1138	15.50	9.67	10.00
69	Alfalfa Horse Feed, J. W. Eshelman, Lancaster, Pa.	Lancaster, John W. Eshelman.	69	17.13	10.24	10.00
271	Alfalfa Horse Feed, J. W. Eshelman, Lancaster, Pa.	Mt. Penn, Nein Brothers,	271	13.57	11.80	10.00
974	Alfalfa Horse Feed, J. W. Eshelman, Lancaster, Pa.	Carlisle, W. S. Stuart, ..	974	17.59	10.32	10.00
		Average, .....	.....	15.94	10.43	.....

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.03	Per ct. 4.02	Per ct. 5.53	Per ct. 13.30	Per ct. 2.10	Corn, oats, barley feed, alfalfa and molasses.	As certified,	777
2.06	1-2	3.76	15-25	20.00	Cracked corn, rolled oats, alfalfa meal, molasses and a trace of salt.	As certified,	1151
3.69	2-4	4.57	10-12	2.00	Cracked corn, crushed oats, wheat bran, molasses and a small percentage of salt.	As certified,	659
2.02	2.00	13.13	12.00	30.00	Cracked corn, crushed oats, alfalfa meal, molasses and a small percentage of salt.	As certified,	5
2.21	1.50	10.45	15.00	35.00	Corn, oats, barley, alfalfa meal and molasses.	As certified,	828
2.03	1.50	11.09	15.00	1.75	Corn, oats, barley, alfalfa meal and molasses.	As certified,	1007
2.12	.....	10.77	.....	35.00			
2.30	2.50	11.99	12.00	1.75	Ground alfalfa, corn, oats and sugar cane molasses.	As certified,	639
3.19	2.50	3.41	12.00	1.70	Ground alfalfa, corn, oats, cottonseed meal and sugar cane molasses.	As certified,	347
2.55	2.50	9.15	12.00	1.85	Ground alfalfa, corn, oats and sugar cane molasses.	As certified,	993
2.37	2.50	8.93	12.00	35.00	Ground alfalfa, corn, oats, cottonseed meal and sugar cane molasses.	As certified,	590
3.46	2.50	7.19	12.00	1.80	Ground alfalfa, corn, oats and sugar cane molasses.	As certified,	960
2.93	2.50	9.11	12.00	1.80	Ground alfalfa, corn, oats and sugar cane molasses.	As certified,	965
3.14	2.50	11.26	12.00	1.75	Ground alfalfa, corn, oats and sugar cane molasses.	As certified,	1100
2.85	.....	9.43	.....	35.43			
3.00	2.00	9.43	15.00	32.00	Corn, oats, alfalfa and cane molasses.	As certified,	855
2.78	3.00	9.72	15.00	1.75	Corn, oats, alfalfa and cane molasses.	As certified,	823
2.89	.....	9.67	.....	33.50			
1.96	3.00	12.17	15.00	25.00	Alfalfa, molasses, cracked corn, barley and oats.	As certified,	1103
2.59	2.50	10.56	12.00	1.80	Molasses, alfalfa, corn, oats, barley and salt.	As certified,	1138
2.76	2.50	9.23	12.00	30.00	Molasses, alfalfa, corn, oats and bran.	Corn, oats, barley, wheat bran, alfalfa and molasses.	69
2.43	2.50	12.61	12.00	1.60	Molasses, alfalfa, corn, oats, barley and salt.	As certified,	271
2.63	2.50	10.46	12.00	23.00	Molasses, alfalfa, corn, oats, barley and salt.	As certified,	974
2.60	.....	10.71	.....	22.75			

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
71	Alfalfa Molasses Horse Feed, John W. Eshelman, Lancaster, Pa.	Lancaster, John W. Eshelman.	71	Per ct. 16.67	Per ct. 10.36	Per ct. 10.00
392	Faramel Horse Feed, Faramel Manufacturing Co., Buffalo, N. Y.	Smethport, F. A. Greene.	392	16.49	10.33	9.00
385	Faramel Horse Feed, Faramel Manufacturing Co., Buffalo, N. Y.	Bradford, Smith Brothers.	385	16.30	9.70	9.00
	Average,			16.39	10.03	.....
1052	Estall Horse Feed, Feed Products Milling Co., Chicago, Ill.	Luzerne, H. N. Schooley & Son.	1052	13.27	12.57	10.00
459	Blue Ribbon Horse Feed, Globe Elevator Co., Buffalo, N. Y.	Mansfield, R. W. & M. F. Rose Co.	459	16.31	9.63	9-11
1154	S. & S. Molasses Horse Feed, Godfrey Shmidheiser & Co., Philadelphia, Pa.	Philadelphia, Godfrey Shmidheiser & Co.	1154	14.76	9.47	9-10
867	Golden Grain Horse and Mule Feed, Golden Grain Milling Co., East St. Louis, Ill.	New Castle, City Roller Mills.	867	16.67	9.31	10.00
1264	Golden Grain Horse and Mule Feed, Golden Grain Milling Co., East St. Louis, Ill.	Pittsburgh, C. J. Cleland.	1264	14.79	10.33	10.00
17	Golden Grain Horse and Mule Feed, Golden Grain Milling Co., East St. Louis, Ill.	York, P. A. & S. Small Co.	17	15.49	10.77	10.00
	Average,			15.65	10.33	.....
308	Puritan Horse and Mule Feed, Golden Grain Milling Co., East St. Louis, Ill.	Mt. Pleasant, J. H. Brown & Son.	308	15.94	9.65	9.00
290	Puritan Horse and Mule Feed, Golden Grain Milling Co., East St. Louis, Ill.	McKeesport, E. P. Junker.	290	17.86	9.96	9.00
	Average,			16.90	9.76	.....
763	Hamlin's Purekane Molasses Feed, Dwight E. Hamlin, Pittsburgh, Pa.	Altoona, E. D. Clark,	763	24.21	6.95	5.00
914	Hamlin's Purekane Molasses Feed, Dwight E. Hamlin, Pittsburgh, Pa.	Harmony, Harmony Cereal Mills.	914	17.43	3.09	5.00
	Average,			20.33	7.44	.....
761	Hamlin's Quality Feed, Dwight E. Hamlin, Pittsburgh, Pa.	Altoona, E. D. Clark,	761	13.52	9.23	9.00
496	Hamlin's Quality Feed, Dwight E. Hamlin, Pittsburgh, Pa.	West Bridgewater, W. W. McCullough.	496	19.12	3.64	9.00
991	Hamlin's Quality Feed, Dwight E. Hamlin, Pittsburgh, Pa.	Washington, Charles B. Kuch.	991	21.63	9.37	9.00
482	Hamlin's Quality Feed, Dwight E. Hamlin, Pittsburgh, Pa.	New Brighton, M. H. Stager.	482	13.97	3.95	9.00
971	Hamlin's Quality Feed, Dwight E. Hamlin, Pittsburgh, Pa.	Carlisle, Frank E. Thompson.	971	20.39	3.55	9.00
	Average,			19.33	3.95	.....
813	Kingalfa Horse Feed, Howard H. Hanks Co., Chicago, Ill.	Wilkesburg, Johnston & Smith.	813	19.35	11.13	3.00
143	Kingalfa Horse Feed, Howard H. Hanks Co., Chicago, Ill.	Johnstown, Johnstown Milling Co.	143	16.67	11.60	3.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 3.37	Per ct. 5.00	Per ct. 7.51	Per ct. 10.00	Per ct. 33.00	Cracked corn, oats, alfalfa, wheat bran, molasses, salt and barley.	As certified,	71
3.57	4.00	5.30	3.00	1.90	Oats, corn, wheat bran and molasses.	Corn, oats, barley, wheat bran, molasses and small amount whole weed seeds.	392
3.65	4.00	4.85	9.00	2.25	Oats, corn, wheat bran and molasses.	Corn, oats, barley, wheat bran and molasses.	385
3.61	.....	5.07	.....	3.08			
1.66	2.00	12.13	15.00	1.35	Alfalfa, molasses, cracked corn, barley and oats.	As certified,	1052
3.08	2-4	10.58	12-14	36.00	Cracked corn, crushed oats, shredded alfalfa, molasses and salt $\frac{1}{2}$ of 1 per cent.	As certified,	459
2.66	1-2	11.30	20-30	31.00	Cracked corn, crushed oats, alfalfa meal, molasses and a trace salt.	As certified,	1154
2.59	2.00	9.60	12.00	32.00	Corn, oats, alfalfa, molasses and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	867
2.45	2.00	10.34	12.00	1.70	Corn, oats, alfalfa, molasses and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	1264
2.29	2.00	12.17	12.00	31.50	Corn, oats, alfalfa, molasses and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	17
2.44	.....	10.70	.....	32.50			
2.11	1.50	11.69	12.00	1.75	Corn, oats, alfalfa, molasses and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	308
2.09	1.50	12.56	12.00	34.00	Corn, oats, alfalfa, molasses and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	290
2.10	.....	12.12	.....	34.50			
1.52	1.50	5.40	8.00	30.00	Dried brewers' and distillers' grains and pure cane molasses.	As certified,	763
2.37	1.50	6.20	8.00	27.00	Dried brewers' and distillers' grains and pure cane molasses.	As certified,	714
2.20	.....	5.80	.....	28.50			
2.31	2.00	9.58	10.00	36.00	Corn, oats, alfalfa, and cane syrup.	As certified,	761
2.00	2.00	10.46	10.00	33.00	Corn, oats, alfalfa, and cane syrup.	As certified,	496
2.16	2.00	10.54	10.00	1.86	Corn, oats, alfalfa, and cane syrup.	As certified,	991
1.99	2.00	10.68	10.00	1.70	Corn, oats, alfalfa, and cane syrup.	As certified,	482
1.73	2.00	10.01	10.00	1.75	Corn, oats, alfalfa, and cane syrup.	As certified,	971
2.04	.....	10.25	.....	35.00			
1.95	3.00	9.56	15.00	1.75	Alfalfa meal, cracked corn, oats and syrup.	As certified,	813
2.73	2.00	9.62	15.00	1.75	Alfalfa meal, cracked corn, oats and syrup.	As certified,	148

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
301	Kingfalfa Horse Feed, Howard H. Hanks Co., Chicago, Ill.	McKeesport, Keystone Commercial Co.	301	Per ct. 14.65	Per ct. 11.82	Per ct. 9.00
261	Kingfalfa Horse Feed, Howard H. Hanks Co., Chicago, Ill.	Reading, Isaiah B. Seibert	261	17.02	11.80	9.00
		Average, .....	.....	16.87	11.53	.....
1250	International Dan Patch Special Horse Feed, International Sugar Feed Co., Minneapolis, Minn.	Erie, Erie Milling & Supply Co.	1250	14.06	10.72	9.00
325	International Dan Patch Special Horse Feed, International Sugar Feed Co., Minneapolis, Minn.	Uniontown, King Brothers	325	16.18	11.81	9.00
895	International Dan Patch Special Horse Feed, International Sugar Feed Co., Minneapolis, Minn.	Butler, P. J. Oesterling & Son.	895	19.67	9.56	9.00
		Average, .....	.....	16.63	10.72	.....
892	International Climax Horse Feed, International Sugar Feed Co., Minneapolis, Minn.	Butler, P. J. Oesterling & Son.	892	18.99	9.67	9.00
600	Venango Horse Feed, Johnson & Co., Franklin, Pa.	Franklin, Johnson & Co., .	600	15.68	10.12	10-11
171	Kay Horse & Mule Feed, Kornfalfa Feed Milling Co., Kansas City, Mo.	Windber, Claude Davis, ..	171	18.54	11.54	9.00
339	Kay Horse & Mule Feed, Kornfalfa Feed Milling Co., Kansas City, Mo.	Uniontown, J. F. Hogsett & Son.	339	17.45	10.45	9.00
		Average, .....	.....	17.99	11.00	.....
336	Badger Evergreen Feed, Charles A. Krause Milling Co., Milwaukee, Wis.	Uniontown, J. F. Hogsett & Son.	336	17.28	11.44	12.00
566	Badger Horse Feed, Charles A. Krause Milling Co., Milwaukee, Wis.	Manor, Hiram Altman & Son.	566	15.48	11.46	10.00
876	Badger Horse Feed, Charles A. Krause Milling Co., Milwaukee, Wis.	New Castle, Fisher & Mengle.	876	19.06	11.60	10.00
288	Badger Horse Feed, Charles A. Krause Milling Co., Milwaukee, Wis.	Greensburg, McFarland Supply Co.	288	19.50	10.03	10.00
101	Badger Horse Feed, Charles A. Krause Milling Co., Milwaukee, Wis.	Harrisburg, Paxton Flour & Feed Co.	101	17.39	11.06	10.00
265	Badger Horse Feed, Charles A. Krause Milling Co., Milwaukee, Wis.	Reading, Werts Milling Co.	265	15.04	10.02	10.00
		Average, .....	.....	17.29	10.53	.....
873	Cream City Horse Feed, Charles A. Krause Milling Co., Milwaukee, Wis.	New Castle, Fisher & Mengle.	873	18.75	9.29	10.00
942	Cream City Horse Feed, Charles A. Krause Milling Co., Milwaukee, Wis.	Troy, H. M. Spalding & Son.	942	19.80	8.61	10.00
		Average, .....	.....	19.27	8.96	.....
870	Harteno Horse Feed, Lake Shore Elevator Co., Cleveland, Ohio.	New Castle, F. W. Hutchinson & Son.	870	14.70	10.22	10.94
1011	Harteno Horse Feed, Lake Shore Elevator Co., Cleveland, Ohio.	Washington H. G. Miller	1011	14.18	10.11	10.94
966	Harteno Horse Feed, Lake Shore Elevator Co., Cleveland, Ohio.	Altoua, R. F. Notley, ..	966	15.71	10.26	10.94
		Average, .....	.....	14.86	10.21	.....

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct.	Per ct.	Per ct.	Per ct.	Per ct.			
2.31	2.00	11.62	15.00	1.75	Alfalfa meal, cracked corn, oats and syrup.	As certified,	301
2.42	2.00	10.96	15.00	1.80	Alfalfa meal, cracked corn, oats and syrup.	As certified,	261
2.35	.....	10.44	.....	1.76			
3.06	3.00	14.56	15.00	31.00	Oats, barley, cracked corn, ground alfalfa, cane molasses and salt.	Cracked corn, oats, ground alfalfa, cane molasses and salt.	1250
1.58	3.00	13.81	15.00	1.80	Oats, barley, cracked corn, ground alfalfa, cane molasses and salt.	As certified,	326
2.46	3.00	10.13	15.00	1.79	Oats, barley, cracked corn, ground alfalfa, cane molasses and salt.	As certified,	895
2.47	.....	12.83	.....	23.67			
2.40	2.00	10.84	17.00	1.60	Cracked corn, oats, alfalfa, oat feed (oat shorts, oat middlings, oat hulls) cane molasses and salt.	As certified,	892
4.22	4-5	5.22	6-7	37.00	Corn, oats, bran and molasses.	Corn, oats, wheat bran, trace of buckwheat and molasses.	600
1.22	1.50	11.97	15.00	34.00	Alfalfa, corn, oats and molasses.	As certified,	171
1.63	1.50	10.41	15.00	1.75	Alfalfa, corn, oats and molasses.	As certified,	339
1.43	.....	11.19	.....	34.50			
0.95	1.00	18.15	30.00	1.60	Alfalfa, molasses and salt.	As certified,	336
2.14	2.00	13.17	12.00	1.60	Corn, oats, alfalfa, molasses and salt.	As certified,	566
1.72	2.00	9.41	12.00	1.65	Corn, oats, alfalfa, molasses and salt.	As certified,	875
2.24	2.00	9.59	12.00	1.60	Corn, oats, alfalfa, molasses and salt.	As certified,	288
2.50	2.00	9.33	12.00	1.60	Corn, oats, alfalfa, molasses and salt.	As certified,	101
2.52	2.00	8.60	12.00	1.70	Corn, oats, alfalfa, molasses and salt.	As certified,	265
2.22	.....	10.01	.....	1.63			
1.60	1.00	8.62	14.00	1.60	Alfalfa meal, molasses, corn, oats and salt.	As certified,	873
1.77	1.50	8.24	14.00	1.65	Alfalfa meal, molasses, corn, oats and salt.	As certified,	942
1.69	.....	8.43	.....	1.63			
4.21	4.50	4.86	6.35	2.00	Corn bran, oats and molasses.	As certified,	870
3.89	4.59	4.04	6.35	2.10	Corn bran, oats and molasses.	As certified,	1011
3.35	4.59	4.62	6.35	2.40	Corn bran, oats and molasses.	As certified,	966
3.96	.....	4.50	.....	2.18			

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
599	Hart's Competition Horse Food, The Lake Shore Elevator Co., Cleveland, Ohio.	New Kensington, J. A. Hawk.	599	15.82	9.18	10.00
606	Hart's Competition Horse Food, The Lake Shore Elevator Co., Cleveland, Ohio.	Franklin, J. H. Lavery,	606	15.75	10.54	10.00
267	Hart's Competition Horse Food, The Lake Shore Elevator Co., Cleveland, Ohio.	Altoona, R. F. Notley, ..	267	14.83	9.74	10.00
		Average, .....	.....	15.46	9.80	.....
1245	Unus Horse and Mule Feed, The Lake Shore Elevator Co., Cleveland, Ohio.	Erie, C. J. Farley & Son,	1245	12.63	10.55	9.00
45	Ox-O Pure Cane Molasses Horse and Mule Feed, The New Oxford Pure Feed Co., New Oxford, Pa.	Hanover, High Street Produce Co.	45	9.21	18.81	17.00
149	OxO Pure Cane Molasses Horse and Mule Feed, The New Oxford Pure Feed Co., New Oxford, Pa.	Somerset, Williams & Ogline.	149	7.96	20.44	17.00
		Average, .....	.....	8.59	19.63	.....
714	Pure-Mo-Lene Horse Feed, A. Nowak & Son, Buffalo, N. Y.	Yeagertown, J. M. Yeager	714	16.05	9.80	9.00
706	Vimolene Pure Horse Feed, A. Nowak & Son, Buffalo, N. Y.	Yeagertown, J. M. Yeager	706	16.66	9.81	8.00
1248	Alcorno Horse Feed, Omaha Alfalfa Milling Co., Omaha, Nebr.	Erie, Erie Milling & Supply Co.	1248	13.37	11.60	10.50
106	Peerless Alfalfa Horse Feed, Omaha Alfalfa Milling Co., Omaha, Nebr.	Harrisburg, Mock & Hartman.	106	15.66	11.55	10.00
249	Peerless Alfalfa Horse Feed, Omaha Alfalfa Milling Co., Omaha, Nebr.	Phillipsburg, J. O. Reed.	249	17.39	10.34	10.00
		Average, .....	.....	16.53	10.95	.....
3	Perfection Horse Feed, Omaha Alfalfa Milling Co., Omaha, Nebr.	York, Anderson Bros. & Co.	3	14.11	11.49	10.00
619	Perfection Horse Feed, Omaha Alfalfa Milling Co., Omaha, Nebr.	Oil City, New Model Milling Co.	619	15.17	9.62	10.00
262	Perfection Horse Feed, Omaha Alfalfa Milling Co., Omaha, Nebr.	Reading, Isaiah B. Seibert	262	15.86	9.88	10.00
		Average, .....	.....	15.04	10.23	.....
1228	Challenge Horse Feed, The D. H. Owen Co., Youngstown Ohio.	Erie, A. P. Allen,	1228	15.33	9.06	10.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct.	Per ct.	Per ct.	Per ct.	Per ct.			
2.98	4.25	6.73	7.00	2.00	Oats, oat feed, corn bran, molasses and a small quantity of salt.	Oats, oat middlings, oat hulls, corn bran, molasses and salt.	599
3.91	4.25	5.89	7.00	1.90	Oats, oat feed, corn bran, molasses and a small quantity of salt.	Oats, oat middlings, oat hulls, corn bran, molasses and salt.	606
2.94	4.25	5.04	7.00	2.00	Oats, oat feed, corn bran and molasses.	Oats, oat middlings, oat hulls, corn bran and molasses.	937
3.61	.....	5.88	.....	1.97			
3.65	2.50	9.73	12.00	1.65	Green alfalfa meal, cracked corn, rolled oats and molasses.	As certified,	1246
4.54	4.50	10.41	9.00	21.00	Recleaned whole oats, corn, new process linseed meal, cottonseed meal, wheat middlings, brewers' grains, malt sprouts, pure cane molasses and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	45
4.87	4.50	10.74	9.00	22.00	Recleaned whole oats, corn, new process linseed meal, cottonseed meal, wheat middlings, brewers' grains, malt sprouts, pure cane molasses and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	149
4.71	.....	10.57	.....	21.50			
2.60	2.00	10.58	12.00	1.85	Cracked corn, crushed oats, whole oats, ground alfalfa, molasses and salt $\frac{1}{2}$ of 1 per cent.	As certified,	714
3.66	2.00	4.75	9.00	2.00	Crushed oats, cracked corn, corn feed meal, wheat bran, molasses and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	708
1.87	2.00	12.51	12.00	20.00	Corn, oats, alfalfa meal and molasses.	As certified,	1248
1.95	2.00	11.98	12.00	22.00	Corn, oats, alfalfa and molasses.	As certified,	106
1.90	2.00	10.85	12.00	1.80	Corn, oats, alfalfa meal and molasses.	As certified,	349
1.93	.....	11.41	.....	24.00			
1.93	2.00	12.47	12.00	21.00	Corn, oats, alfalfa meal and molasses.	As certified,	3
2.35	2.00	12.06	12.00	1.75	Corn, oats, alfalfa meal and molasses.	As certified,	619
2.02	2.00	12.86	12.00	1.80	Corn, oats, alfalfa meal and molasses.	As certified,	262
2.10	.....	12.47	.....	24.00			
2.80	2.50	10.88	12.00	1.50	Alfalfa meal, ground corn, crushed oats, molasses, oat meal mill by-product (oat middlings, oat hulls, oat shorts) and cottonseed meal.	Alfalfa meal, ground corn, crushed oats, oat middlings, oat shorts, oat hulls and molasses.	126

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
1093	Challenge Horse Feed, D. H. Owen & Co., Youngstown, Ohio.	Farrell, J. B. Roux, ...	1099	Per ct. 15.33	Per ct. 9.62	Per ct. 9.00
		Average,		15.35	9.36	.....
997	Mol-Ha Mixing Feed, G. E. Patteson & Co., Memphis, Tenn.	Washington, Washington Milling Co.	997	17.81	5.18	8.50
321	Alfalfa Horse Feed, F. V. Perry, Scottsdale, Pa.	Scottsdale, F. V. Perry, ..	321	16.67	10.85	10-13
87	Peters' Arab Horse Feed, M. C. Peters Mill Co., Omaha, Nebr.	Harrisburg, Hoffer & Garman.	87	16.16	11.46	9.00
1120	Peters' June Pasture, M. C. Peters Mill Co., Omaha, Nebr.	Monongahela, D. E. Gamble.	1120	15.37	12.29	10.00
86	Peters' King Corn, M. C. Peters Mill Co., Omaha, Nebr.	Harrisburg, Hoffer & Garman.	86	16.97	10.74	9.00
1114	Emerald Horse Feed, Prairie State Milling Co., Chicago, Ill.	Monessen, J. A. Hagerman.	1114	17.09	11.86	10.00
990	Emerald Horse Feed, Prairie State Milling Co., Chicago, Ill.	Braddock, Irvin Muir,	990	17.61	11.52	10.00
1171	Emerald Horse Feed, Prairie State Milling Co., Chicago, Ill.	Tarentum, R. J. Toepfer,	1171	16.06	11.97	10.00
		Average,		16.92	11.81	.....
312	Pritts' Alfalfa Horse Feed, J. E. Pritts, Scottsdale, Pa.	Scottsdale, J. E. Pritts, ..	312	19.66	14.43	14-16
860	Green Cross Horse Feed, The Quaker Oats Co., Chicago, Ill.	New Castle, John S. Brown's Son.	860	16.24	9.42	10.00
335	Green Cross Horse Feed, The Quaker Oats Co., Chicago, Ill.	New Salem, Mike Duvava,	335	18.64	10.06	10.00
1123	Green Cross Horse Feed, The Quaker Oats Co., Chicago, Ill.	Coatesville, Handwork Brothers.	1123	16.34	9.57	10.00
278	Green Cross Horse Feed, The Quaker Oats Co., Chicago, Ill.	Greensburg, Hudson & Kuhns.	278	18.24	9.73	10.00
594	Green Cross Horse Feed, The Quaker Oats Co., Chicago, Ill.	New Kensington, A. H. Klugh.	594	16.85	9.99	10.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 2.29	Per ct. 2.00	Per ct. 12.15	Per ct. 12.00	Per ct. 1.90	Corn, oats, alfalfa, molasses and salt.	As certified,	1093
2.55	.....	12.01	.....	1.55			
0.79	1.00	16.92	19.00	1.25	Ground rice straw and cane molasses.	Ground rice straw, cane molasses and trace of rice hulls.	997
2.42	2-5	6.45	6-9	36.00	Alfalfa, molasses, cracked corn, oats, bran, oil meal and salt.	Cracked corn, oats, wheat bran, linseed oil meal, alfalfa, molasses and salt.	321
2.61	3.00	8.19	15.00	34.00	Corn, oats, alfalfa and molasses.	As certified,	87
1.20	0.50	20.18	26.00	1.60	Pure alfalfa meal light with molasses.	As certified,	1120
1.97	1.25	11.20	18.00	22.00	Corn, oats, alfalfa and molasses.	As certified,	86
1.24	2.50	12.81	12.00	1.75	Cracked corn, oats, barley, alfalfa meal, and molasses.	As certified,	1114
1.96	2.50	9.33	12.00	1.65	Cracked corn, oats, barley, alfalfa meal, and molasses.	As certified,	990
1.59	2.50	10.04	12.00	34.00	Cracked corn, oats, barley, alfalfa meal, and molasses.	As certified,	1171
1.60	.....	10.72	.....	34.00			
4.07	4.5-6	6.94	12.00	1.75	Alfalfa meal, wheat bran, wheat middlings, corn, oats and molasses.	As certified,	312
2.56	2.50	10.63	12.00	1.65	Alfalfa meal, ground corn, crushed oats, molasses, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts.)	As certified,	890
2.43	2.50	10.53	12.00	1.75	Alfalfa meal, ground corn, crushed oats, molasses, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts.)	As certified,	335
2.59	2.50	10.94	12.00	23.00	Alfalfa meal, ground corn, crushed oats, molasses, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts.)	As certified,	1123
2.56	2.50	11.96	12.00	34.00	Alfalfa meal, ground corn, crushed oats, molasses, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts.)	As certified,	273
2.65	2 3/4	10.15	12.00	1.95	Alfalfa meal, ground corn, crushed oats, molasses, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts.)	As certified,	594

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
758	Green Cross Horse Feed, The Quaker Oats Co., Chicago, Ill.	Altoona, Miller Brothers,	758	Per ct. 17.11	Per ct. 10.95	Per ct. 10.00
839	Green Cross Horse Feed, The Quaker Oats Co., Chicago, Ill.	Lewisburg, E. C. Noll, ...	839	19.14	9.73	10.00
912	Green Cross Horse Feed, The Quaker Oats Co., Chicago, Ill.	Butler, B. F. Shannon & Co.	912	18.62	9.50	10.00
1175	Green Cross Horse Feed, The Quaker Oats Co., Chicago, Ill.	Tarentum, J. A. Sharp, ..	1175	14.20	10.05	10.00
22	Green Cross Horse Feed, The Quaker Oats Co., Chicago, Ill.	York, Strayer Brothers Co.	22	16.63	10.08	10.00
1003	Green Cross Horse Feed, The Quaker Oats Co., Chicago, Ill.	Houston, W. M. Templeton & Sons.	1003	18.08	10.01	10.00
853	Green Cross Horse Feed, The Quaker Oats Co., Chicago, Ill.	Mifflinburg, Union Hardware Co.	853	18.13	9.78	10.00
1170	Green Cross Horse Feed, The Quaker Oats Co., Chicago, Ill.	Homestead, Vallowe Bros.	1170	15.41	10.48	10.00
		Average, .....	.....	17.19	9.95	.....
1144	Horse Power Brand Feed, The Quaker Oats Co., Chicago, Ill.	West Chester, I. H. Bailey	1144	14.57	11.68	10.00
869	Horse Power Brand Feed, The Quaker Oats Co., Chicago, Ill.	New Castle, F. W. Hutchinson & Son.	869	15.35	10.53	10.00
		Average, .....	.....	14.96	11.12	.....

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 2.39	Per ct. 2.50	Per ct. 10.12	Per ct. 12.00	Per ct. 1.80	Alfalfa meal, ground corn, crushed oats, molasses, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts.)	As certified,	753
1.98	2.50	10.77	12.00	33.00	Alfalfa meal, ground corn, crushed oats, molasses, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts.)	As certified,	839
2.85	2.50	9.20	12.00	1.75	Alfalfa meal, ground corn, crushed oats, molasses, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts.)	As certified,	912
3.00	2.50	9.82	12.00	1.75	Alfalfa meal, ground corn, crushed oats, molasses, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts.)	As certified,	1175
2.22	2.50	11.86	12.00	22.00	Alfalfa meal, ground corn, crushed oats, molasses, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts.)	As certified,	22
2.50	2.50	10.34	12.00	1.75	Alfalfa meal, ground corn, crushed oats, molasses, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts.)	As certified,	1008
2.49	2.50	9.88	12.00	1.75	Alfalfa meal, ground corn, crushed oats, molasses, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts.)	As certified,	853
2.75	2.50	11.57	12.00	1.70	Alfalfa meal, ground corn, crushed oats, molasses, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts.)	As certified,	1170
2.55	.....	10.58	.....	24.54			
2.75	2.80	9.86	11.00	24.00	Ground corn, crushed oats, new process linseed oil meal, molasses, oat meal mill by-product (oat middlings, oat hulls, oat shorts.)	As certified,	1144
2.63	3.80	8.12	11.00	1.75	Ground corn, crushed oats, new process linseed oil meal, molasses, oat meal mill by-product (oat middlings, oat hulls, oat shorts.)	As certified,	369
2.00	.....	8.74	.....	24.50			

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.		
					Found.	Guaranteed.	
280	Good Luck Feed with Molasses, Ralston Purina Co., St. Louis, Mo.	Latrobe, Latrobe Feed Supply Co.	280	Per ct. 18.22	Per ct. 10.85	Per ct.	
474	Purina Feed with Molasses, Ralston Purina Co., St. Louis, Mo.	Beaver Falls, John G. Allen.	474	15.23	10.82	9.30	
161	Purina Feed with Molasses, Ralston Purina Co., St. Louis, Mo.	Somerset, H. C. Beerits' Sons.	161	16.33	9.94	9.30	
573	Purina Feed with Molasses, Ralston Purina Co., St. Louis, Mo.	Pittsburgh, Dillworth Bros. Co.	573	16.69	9.38	9.50	
374	Purina Feed with Molasses, Ralston Purina Co., St. Louis, Mo.	Bradford, L. A. Fischer & Co.	374	16.57	9.12	9.30	
388	Purina Feed with Molasses, Ralston Purina Co., St. Louis, Mo.	Smethport, Herzog Milling Co.	388	16.66	9.51	9.30	
1238	Purina Feed with Molasses, Ralston Purina Co., St. Louis, Mo.	Wesleyville, W. D. Ripley	1238	18.99	10.01	9.30	
260	Purina Feed with Molasses, Ralston Purina Co., St. Louis, Mo.	Reading, Isaiah B. Seibert	260	17.76	8.83	9.30	
21	Purina Feed with Molasses, Ralston Purina Co., St. Louis, Mo.	York, Strayer Brothers Co.	21	16.55	9.36	9.30	
178	Purina Feed with Molasses, Ralston Purina Co., St. Louis, Mo.	Johnstown, A. F. Stutzman & Co.	178	15.28	10.44	9.30	
		Average, .....	.....	16.17	9.69	.....
597	Butler's Special Horse Feed, The Wash-Co Alfalfa, M. F. & Milling Co., Calhoun, Nebr.	New Kensington, J. A. Hawk.	597	16.69	10.31	10.00	
988	Practical Horse Feed, The Wash-Co Alfalfa Milling Co., Calhoun, Nebr.	Braddock, Irvin Muir,	988	15.88	11.22	8.00	
882	Otto Weiss Sweet Feed No. 4, The Otto Weiss Alfalfa Stock Food Co., Wichita, Kans.	Pittsburgh, The I. W. Scott Co.	882	18.42	11.27	10.00	
217	Chicago Alfalfa Horse & Mule Feed, The Western Grain Products Co., Hammond, Ind.	Palmyra, Early & Detweiler.	217	14.77	12.12	10.00	
1147	Wilson's Alfalfa Molasses Horse Feed, John C. Wilson, Philadelphia, Pa.	Philadelphia, John C. Wilson.	1147	14.56	10.47	6-9	
1146	C. Wilt & Son's Standard Horse Feed, C. Wilt & Son, Philadelphia, Pa.	Philadelphia, C. Wilt & Son.	1146	14.42	10.63	5-8	
482	Xtra-Vim Feed, Xtravim Molasses Feed Co., Boston, Mass.	Elkland, Elkland Roller Mills.	482	21.88	3.76	4.61	
451	Xtra-Vim Feed, Xtravim Molasses Feed Co., Boston, Mass.	Mansfield, Equity Co-Operative Exchange.	451	22.89	3.65	4.61	

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Observer's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 2.36	Per ct.	Per ct. 12.02	Per ct.	Per ct. 33.00	.....	Cracked corn, oats, alfalfa meal, molasses and salt.	280
2.76	1.70	10.37	11.70	1.75	Cracked corn, whole oats, ground alfalfa molasses and 1 per cent. salt.	As certified,	474
2.48	1.70	8.70	11.70	1.85	Cracked corn, whole oats, ground alfalfa molasses and 1 per cent. salt.	As certified,	161
2.44	1.70	9.93	11.70	1.75	Cracked corn, whole oats, ground alfalfa molasses and 1 per cent. salt.	As certified,	573
2.54	1.70	9.29	11.70	1.75	Cracked corn, whole oats, ground alfalfa, molasses and 1 per cent. salt.	As certified,	374
2.42	1.70	10.46	11.70	1.75	Cracked corn, whole oats, ground alfalfa, molasses and 1 per cent. salt.	As certified,	388
2.49	1.70	9.18	11.70	1.65	Cracked corn, whole oats, ground alfalfa, molasses and 1 per cent. salt.	As certified,	1238
2.27	1.70	8.91	11.70	1.90	Cracked corn, whole oats, ground alfalfa, molasses and 1 per cent. salt.	As certified,	280
2.14	1.70	10.43	11.70	35.00	Cracked corn, whole oats, ground alfalfa, molasses and 1 per cent. salt.	As certified,	21
2.94	1.70	8.52	11.70	1.85	Cracked corn, whole oats, ground alfalfa, molasses and 1 per cent. salt.	As certified,	178
2.50	.....	9.53	.....	35.56	.....	.....	.....
2.05	2.00	10.24	12.00	1.80	Corn, oats and alfalfa flavored with syrup.	Corn, oats, barley, alfalfa and molasses.	597
1.91	1.50	11.20	15.00	1.65	Corn, alfalfa and syrup.	As certified,	988
2.38	2.00	11.56	15.00	34.00	Alfalfa meal, corn chop, crushed oats, wheat bran, $\frac{3}{4}$ of 1 per cent. salt and cane molasses.	As certified,	882
2.53	2.00	13.50	15.00	1.75	Corn, oats, alfalfa, linseed meal, molasses and 3-10 of 1 per cent. salt.	As certified,	217
3.09	1-2	11.47	15-20	32.00	Cracked corn, oats, alfalfa meal, molasses and 1 per cent. salt.	As certified,	1147
3.33	1-2	9.38	15-20	1.60	Cracked corn, oats, alfalfa meal and molasses.	Cracked corn, oats, alfalfa meal, molasses and salt.	1146
0.58	0.81	4.51	4.50	1.75	Pure cane sugar molasses mixed with a small percentage of sphagnum moss and dehydrated.	As certified,	482
0.56	0.81	4.87	4.50	1.75	Pure cane sugar molasses mixed with a small percentage of sphagnum moss and dehydrated.	As certified,	483

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.		
					Found.	Guaranteed.	
404	Xtra-Vim Feed, Xtravim Molasses Feed Co., Boston, Mass.	Port Allegany, Port Allegany Milling Co.	404	Per ct. 21.73	Per ct. 5.25	Per ct. 4.61	
420	Xtra-Vim Feed, Xtravim Molasses Feed Co., Boston, Mass.	Westfield, H. Z. Pride & Son.	420	20.83	3.91	4.61	
655	Xtra-Vim Feed, Xtravim Molasses Feed Co., Boston, Mass.	Ridgway, Smith Brothers Co.	655	19.84	5.05	4.61	
		Average,		21.43	4.22	.....
PROPRIETARY CALF MEALS.							
682	Blatchford's Calf Meal, The Blatchford Calf Meal Factory, Waukegan, Ill.	Muncy, City Flouring Mills, Inc.	682	9.43	24.75	24-25	
137	Blatchford's Calf Meal, The Blatchford Calf Meal Factory, Waukegan, Ill.	South Fork, J. E. Crisman.	137	12.22	24.81	24-25	
14	Blatchford's Calf Meal, The Blatchford Calf Meal Factory, Waukegan, Ill.	York, H. H. Smyser,	14	10.13	25.19	24-25	
721	Blatchford's Calf Meal, The Blatchford Calf Meal Factory, Waukegan, Ill.	Lewistown, Spanogle-Yeager Milling Co.	721	10.16	25.06	24-25	
1200	Blatchford's Calf Meal, The Blatchford Calf Meal Factory, Waukegan, Ill.	Indiana, St Clair, Hinn & Co.	1200	10.75	22.00	11.00	
		Average,		10.53	24.76	.....

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found	Guaranteed.	Found.	Guaranteed.				
Per ct. 0.65	Per ct. 0.81	Per ct. 5.11	Per ct. 4.50	Per ct. 1.75	Pure cane sugar molasses mixed with a small percentage of sphagnum moss and dehydrated.	As certified,	404
0.57	0.81	4.98	4.50	1.75	Pure cane sugar molasses mixed with a small percentage of sphagnum moss and dehydrated.	As certified,	420
0.61	0.81	4.95	4.50	1.80	Pure cane sugar molasses with a small percentage of sphagnum moss.	As certified,	655
0.59	.....	4.83	.....	1.75			
5.23	5-6	6.22	5-6	3.25	Locust bean meal, unpressed flaxseed, wheat flour, barley meal, ground beans and peas, old process oil meal, cocoa shell meal, cocoanut meal, recleaned cottonseed meal, foenugreek, anise and salt.	As certified,	633
5.23	5-6	6.46	5-6.75	3.40	Locust bean meal, unpressed flaxseed, wheat flour, barley meal, ground beans and peas, old process oil meal, cocoa shell meal, cocoanut meal, recleaned cottonseed meal, foenugreek, anise and salt.	As certified,	137
5.35	5-6	6.63	5-6.75	3.50	Locust bean meal, unpressed flaxseed, wheat flour, barley meal, ground beans and peas, old process oil meal, cocoa shell meal, cocoanut meal, recleaned cottonseed meal, foenugreek, anise and salt.	As certified,	14
5.48	5-6	6.35	5-6.25	4.00	Locust bean meal, unpressed flaxseed, wheat flour, barley meal, ground beans and peas, old process oil meal, cocoa shell meal, cocoanut meal, recleaned cottonseed meal, foenugreek, anise and salt.	As certified,	721
5.65	5.00	6.24	6.75	3.50	Locust bean meal, unpressed flaxseed, wheat flour, barley meal, ground beans and peas, rice polish, old process oil meal, cocoa shell meal, cocoanut meal, recleaned cottonseed meal, foenugreek, dried milk, anise and salt.	As certified,	1276
5.40	.....	6.38	.....	3.53			

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
61	Calf Meal, John W. Eshelman, Lancaster, Pa.	Lancaster, John W. Eshelman.	61	Per ct. 10.53	Per ct. 17.19	Per ct. 16-18
555	Calf Meal, John W. Eshelman, Lancaster, Pa.	Leaman Place, Harry K. Hershey.	555	8.91	17.50	16-18
		Average, .....	.....	9.72	17.35	.....
976	International Grofast Calf Meal, International Stock Food Co., Minneapolis, Minn.	Carlisle, W. S. Stuart, ..	976	9.92	27.39	25.00
40	Sugarota Calf Meal, North West Mills Co., Winona, Minn.	Hanover, Geo. Hull & Sons.	40	10.31	27.25	25.00
345	Sugarota Calf Meal, North West Mills Co., Winona, Minn.	Connellsville, Perry & Henderson.	345	10.13	25.19	25.00
		Average, .....	.....	10.22	26.22	.....
706	Schumacher Calf Meal, The Quaker Oats Co., Chicago, Ill.	Mifflin, W. H. Manbeck & Co.	706	8.52	20.06	19.00
785	Schumacher Calf Meal, The Quaker Oats Co., Chicago, Ill.	Corry, Wales & Spencer,	785	7.59	20.33	19.00
		Average, .....	.....	8.05	20.22	.....
810	Ryde's Cream Calf Meal, Ryde & Co., Chicago, Ill.	Reynoldsville, Fales Grocery Co.	810	10.33	25.50	25.00
PROPRIETARY SWINE FEEDS.						
1117	Sucrene Hog Meal, American Milling Co., Peoria, Ill.	Monongahela, D. E. Gamble.	1117	11.53	14.19	16.00
842	Sucrene Hog Meal, American Milling Co., Peoria, Ill.	Lewisburg H. C. Noll, ..	842	13.23	15.39	15.00
		Average, .....	.....	12.33	15.04	.....

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 3.17	Per ct. 3-4	Per ct. 3.04	Per ct. 2-3	Per ct. 50.00	Cooked and baked wheat feed, flour, cottonseed and linseed meal, wheat middlings, pure ground flaxseed, oat meal and blood meal.	As certified,	61
3.75	3-4	3.76	2-3	3.50	Cooked and baked wheat feed, flour, cottonseed and linseed meal, wheat middlings, pure ground flaxseed, oat meal and blood meal.	As certified,	555
3.46	.....	3.40	.....	60.00			
5.98	5.00	9.09	10.00	4.00	Foenugreek seed, locust bean, linseed oil meal, red dog flour and mixed broken grains of cereal plants separated from wheat, oats, barley and flax screenings.	As certified,	976
5.86	6.00	5.43	6.00	4.00	Pulverized wheat, pulverized malt, linseed meal and cottonseed meal.	As certified,	40
5.78	6.00	4.58	6.00	4.00	Pulverized wheat, pulverized malt, linseed meal and cottonseed meal.	As certified,	345
5.82	.....	5.00	.....	4.00			
5.05	3.00	3.08	3.00	3.00	Oat meal, wheat meal, ground flaxseed, dried casein cottonseed meal, $\frac{1}{2}$ of 1 per cent. bi-carbonate of soda.	As certified,	706
3.89	3.00	3.27	3.00	3.50	Oat meal, wheat meal, ground flaxseed, dried casein cottonseed meal, $\frac{1}{2}$ of 1 per cent. bi-carbonate of soda.	As certified,	785
3.47	.....	3.17	.....	3.25			
5.58	5.00	6.15	6.00	3.25	Carob beans, flaxseed, wheat flour, cottonseed meal, beans and lentils, foenugreek, anise, cocoa meal, trace of salt.	As certified,	810
5.62	2.50	6.06	12.00	1.75	Molasses, ground and bolted grain screenings, corn meal, corn gluten feed, linseed meal and salt.	As certified,	1117
5.33	5.00	7.48	10.00	32.00	Molasses, ground and bolted grain screenings, corn meal, corn gluten feed, linseed meal and salt.	As certified,	843
3.48	.....	6.78	.....	33.50			

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
883	Blatchford's Pig Meal, The Blatchford Calf Meal Factory, Waukegan, Ill.	Butler, H. J. Klingler & Co.	883	Per ct. 9.21	Per ct. 19.50	Per ct. 18.00
243	Blatchford's Pig Meal, The Blatchford Calf Meal Factory, Waukegan, Ill.	Reading, Aug. O. Werts & Bro.	243	9.88	20.85	18.00
		Average,		9.54	19.33	.....
68	Hog Feed 10% Tankage, John W. Eschelman, Lancaster, Pa.	Lancaster, John W. Eschelman.	68	10.16	18.88	16.00
894	International Hog Feed and 5% Charcoal, International Sugar Feed Co., Minneapolis, Minn.	Butler, P. J. Oesterling & Son.	894	14.80	20.56	23.50
834	McMahan's Special Pig Grower, C. H. McMahan, Milton, Pa.	Milton, C. H. McMahan,	834	9.08	17.33	15-15.87
46	Ox-O Pure Cane Molasses Swine Feed, The New Oxford Pure Feed Co., New Oxford, Pa.	Hanover, High Street Produce Co.	46	9.71	23.94	20.00
313	Pritts' Pig Feed, J. E. Pritts, Scottsdale, Pa.	Scottsdale, J. E. Pritts, ..	313	12.86	15.56	16-18
1161	Purina Pig Feed, Ralston Purina Co., St. Louis, Mo.	Derry, L. A. Wheeler, ..	1161	14.78	11.86	14.00
PROPRIETARY CHOP FEEDS.						
1048	No. 2 Chop, Bergin & Co., Nanticoke, Pa.	Nanticoke, Bergin & Co.,	1048	11.75	10.31	6.5-9.5
126	Buckeye Chop Feed, The Buckeye Cereal Co., Massillon, Ohio.	South Fork, J. E. Crisman.	126	8.90	11.13	8.00
464	Henkel's Chop Feed, The Commercial Milling Co., Detroit, Mich.	Wellsboro, The Farmers' Feed Store.	464	11.00	9.81	9.00
126	Cow Chop, W. A. Eckenrode, Carrolltown, Pa.	Carrolltown, W. A. Eckenrode.	126	12.93	12.00	.....
1252	Tuxedo Chop, The Early & Daniel Co., Cincinnati, Ohio.	Erie, Erie Milling & Supply Co.	1252	12.63	12.34	12.50

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 5.12	Per ct. 5.00	Per ct. 6.84	Per ct. 7.00	Per ct. 3.50	Linseed oil meal, oat meal, wheat flour, barley meal, re-cleaned cottonseed meal, cocoa shell meal, bean meal, crushed flaxseed, foenugreek, salt and corn meal.	Linseed oil meal, oat meal, wheat flour, barley meal, locust bean meal, bean meal, crushed flaxseed, re-cleaned cottonseed meal, cocoa shell meal, foenugreek, ground anise seed, rice polish, corn meal and salt.	833
4.67	5.00	7.38	7.00	3.50	Linseed oil meal, oat meal, wheat flour, barley meal, re-cleaned cottonseed meal, cocoa shell meal, bean meal, crushed flaxseed, foenugreek and salt.	As certified,	243
4.90	.....	7.11	.....	3.50			
5.86	5.00	7.66	4.50	31.00	Ground corn, ground rye, ground grain screenings, digester tankage, wheat middlings and charcoal.	Ground corn, ground rye, oats, ground grain screenings, digester tankage, wheat middlings and charcoal.	68
4.94	5.00	12.07	12.00	1.85	Old process oil meal, tankage, molasses, grain middlings, charcoal and salt.	Old process linseed oil meal, tankage, ground grain screenings, molasses, charcoal and salt.	394
8.33	8-8.50	6.92	6-7	34.00	Brewers' dried grains, malt sprouts, cottonseed meal, hominy meal.	As certified,	834
4.29	4.50	7.43	5.50	32.00	New process linseed meal, cottonseed meal, gluten, wheat middlings, wheat bran, ground corn, brewers' grains, malt sprouts, pure cane molasses, $\frac{1}{2}$ of 1 per cent. salt.	As certified,	46
3.53	3-4	6.96	4.5-6.5	1.75	Corn chop, wheat middlings, charcoal, alfalfa meal, low grade flour and digester tankage.	As certified,	313
2.77	2.00	7.35	10.00	1.75	Corn feed meal, alfalfa, molasses, humus or peat and 1 per cent. salt.	As certified,	1161
4.08	2.5-4.1	3.55	3.2-5.5	1.90	Oats, corn bran, corn and oat hulls.	Corn, corn bran, buckwheat, oats and oat hulls.	1043
4.31	3.50	11.44	8.50	30.00	Corn, grain screenings, oats by-product.	Corn, oat middlings, oat hulls and grain screenings.	135
4.87	4.50	6.07	9.00	1.60	Corn meal, rye and oat middlings, oats and oat hulls.	Corn meal, oats, rye buckwheat, oat middlings and oat hulls.	464
4.34	.....	5.39	.....	1.85	Corn, oats, buckwheat and buckwheat middlings.	As certified,	126
3.80	4.00	8.71	10.00	24.00	Alfalfa meal, corn, oats, brewers' grains, molasses.	As certified,	1253

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
816	Tuxedo Chop, The Early & Daniel Co., Cincinnati, Ohio.	Wilkinsburg, Johnston & Smith.	816	Per ct. 15.37	Per ct. 12.60	Per ct. 12.50
824	Tuxedo Chop, The Early & Daniel Co., Cincinnati, Ohio.	Carnegie, Richey & Carlisle.	824	17.17	12.15	12.50
		Average,		15.33	12.04	.....
827	Pioneer Chop, Edwards & Loomis Co., Chicago, Ill.	Carnegie, J. H. Burgan & Son.	827	10.23	11.06	10.00
1254	Fairplay C. O. & B. Chop Feed, Fairplay Feed Mills, Linton, Ind.	Hays, John Lachman & Co.	1254	10.36	7.83	7-9
426	No. 1 Chop Feed, Globe Elevator Co., Buffalo, N. Y.	Westfield, Frank A. Ackley.	426	10.29	9.88	7-9
793	No. 1 Chop Feed, Globe Elevator Co., Buffalo, N. Y.	Punxsutawney, Jefferson Flour & Feed Co.	793	10.41	11.33	7-9
791	No. 1 Chop Feed, Globe Elevator Co., Buffalo, N. Y.	Lindsey, Keystone Flour & Feed Co.	791	10.20	11.31	7-9
		Average,		10.30	10.69	.....
340	C. Chop, J. F. Hogsett & Son, Uniontown, Pa.	Uniontown, J. F. Hogsett & Son.	340	11.83	9.63	8.00
478	Premium Chop, The Imperial Grain & Milling Co., Toledo, Ohio.	Beaver Falls, Dodds & Garrett.	478	9.73	9.50	8.00
282	Premium Chop, The Imperial Grain & Milling Co., Toledo, Ohio.	Latrobe, Latrobe Feed & Supply Co.	282	8.76	9.31	8.00
1211	Premium Chop, The Imperial Grain & Milling Co., Toledo, Ohio.	Blairsville, George J. New.	1211	8.58	9.06	8.00
		Average,		9.02	9.29	.....
965	Special C. O. & B. Chop Feed, John Lachman & Co., Hays, Pa.	Braddock, John Lachman,	965	10.30	8.50	7-9
958	Puritan No. 2 Chop, The Lake Shore Elevator Co., Cleveland, Ohio.	Altoona, R. F. Notley.	958	11.11	7.83	7.30
751	Standard Chop, W. H. Long, Howard, Pa.	Howard, W. H. Long,	751	10.60	13.00	8-10
1057	No. 1 Chop, Luzerne Milling Co., Luzerne, Pa.	Luzerne, Luzerne Milling Co.	1057	10.36	10.75	10.50
1041	Red Star Mixed Chop, Mauser Mill Co., Laurys Station, Pa.	Hazleton, Mauser Mill Co.,	1041	11.53	10.81	7-12
1028	No. 1 Chop, Miner-Hillard Milling Co., Wilkes-Barre, Pa.	Wilkes-Barre, Miner-Hillard Milling Co.	1028	11.09	10.19	10-12

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 3.88	Per ct. 4.00	Per ct. 9.40	Per ct. 10.00	Per ct. 2.90	Alfalfa meal, corn, oats, brewers' grains, molasses.	As certified,	816
3.89	4.00	8.12	10.00	1.80	Alfalfa meal, corn, oats, brewers' grains, molasses.	As certified,	824
3.86	.....	8.74	.....	36.67			
3.88	2.50	8.07	9.00	1.90	Corn feed meal, oat feed, wheat middlings, wheat bran and corn gluten feed.	Corn feed meal, oat middlings, oat hulls, wheat middlings, wheat bran and corn gluten feed.	827
3.39	3-4	8.17	7-9	1.50	White or yellow corn, oats, barley, corn meal mill by-product, (fine meal and siftings), oat meal by-products (oat middlings, oat groats, oat hulls) and salt.	Corn, oats, corn meal and siftings, oat groats, oat middlings, oat hulls and salt.	1254
3.94	3-5	7.35	9.00	1.50	Corn, oats, oat hulls, flour middlings and salt $\frac{1}{2}$ of 1 per cent.	As certified,	426
4.23	3-5	5.48	9.00	.....	Corn, oats, oat hulls, flour middlings and salt $\frac{1}{2}$ of 1 per cent.	Ground corn and oats, wheat flour middlings, milo maize, Kafir corn, oat hulls and salt.	798
4.20	3-5	5.34	9.00	1.70	Corn, oats, oat hulls, flour middlings and salt $\frac{1}{2}$ of 1 per cent.	As certified,	791
4.12	.....	6.05	.....	1.60			
4.10	3.00	7.48	8.00	32.00	Corn, oats, rye and oat hulls.	As certified,	349
3.67	3.50	7.67	9.00	30.00	Shelled and ear corn, cottonseed meal, white hominy meal, oat middlings, oat shorts, oat hulls and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	478
4.25	3.50	7.60	9.00	1.50	Shelled and ear corn, cottonseed meal, white hominy meal, oat middlings, oat shorts, oat hulls and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	282
4.05	3.50	9.26	9.00	1.65	Shelled and ear corn, cottonseed meal, white hominy meal, oat middlings, oat shorts, oat hulls and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	1211
3.99	.....	8.17	.....	31.00			
3.97	3.5-4.5	8.10	7-9	1.60	Corn, oats, barley, oat middlings, oat groats and oat hulls.	Corn, oats, oat middlings, oat groats, oat hulls and salt.	985
2.10	3.00	8.29	8.85	2.00	Corn, oats, and oat hulls, etc.	Corn, oats and oat hulls.	968
4.22	3-4	5.19	9-11	34.00	Corn, oats, rye and wheat middlings.	Corn, oats, rye, wheat middlings and trace of barley.	751
4.13	3.50	4.22	9.00	1.95	Corn, oats, rye and wheat middlings.	As certified,	1057
4.17	3-4	3.86	6-10	1.55	Corn, oats, middlings and hominy.	As certified,	1941
3.88	3.5-4	3.96	3-5	2.00	Corn, oats and middlings.	As certified,	1028

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
168	C. O. & B. Chop, Mollett Grain & Milling Co., McClure, Ohio.	Windber, Claude Davis, ..	168	Per ct. 11.63	Per ct. 9.31	Per ct. 7-9
292	Park City Chop, The Mollett Grain & Milling Co., McClure, Ohio.	McKeesport, Keystone Commercial Co.	292	9.08	9.56	8-9
1059	A Chop, Robbins Milling Co., Wilkes-Barre, Pa.	Wilkes-Barre, Robbins Milling Co.	1059	9.20	11.25	8-11
1058	B Chop, Robbins Milling Co., Wilkes-Barre, Pa.	Wilkes-Barre, Robbins Milling Co.	1058	8.90	10.56	8-10
1055	No. 3 Mixed Chop, H. N. Schooley & Son, Luzerne, Pa.	Luzerne, H. N. Schooley & Son.	1055	11.85	8.94	8.67
123	Camp's C. O. B. K. Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	South Fork, J. E. Crisman.	123	9.83	8.69	7-8
298	Camp's C. O. & B. Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	McKeesport, Keystone Commercial Co.	298	9.69	8.81	7-9
900	Camp's C. O. & B. Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	Mars, Mars Milling & Feed Co.	900	10.65	8.50	7-9
826	Camp's C. O. & B. Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	Carnegie, Richey & Carlisle.	826	10.08	9.00	7-9
632	Camp's C. O. & B. Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	DuBois, Timlin, Kelly & Co.	632	10.53	10.50	7-9
		Average, .....	.....	10.25	9.20	.....
742	Camp's Little Wonder Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	Lock Haven, M. L. Olaster	742	10.46	9.13	7-8
131	Camp's Little Wonder Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	South Fork, J. E. Crisman.	131	9.21	8.81	7-8
187	Camp's Little Wonder Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	Bedford, N. M. & O. R. Diehl.	187	11.63	9.19	7-8

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 6.06	Per ct. 3-4.5	Per ct. 8.90	Per ct. 7-9	Per ct. 22.00	Corn, oats, oat hulls, oat middlings, oat groats and barley.	Corn, oats, oat middlings, oat groats, oat hulls, barley and large amount of corn cleanings.	168
5.60	3.5-4.5	8.84	8.5-9	1.65	Corn, oats and oat hulls.	As certified,	292
5.27	3-5	7.23	5-7	2.00	Corn, hominy, oats, rye middlings, oat middlings and hulls.	As certified,	1069
5.94	4-5	8.16	6-8	1.90	Corn, hominy, oat middlings and hulls.	As certified,	1073
3.06	2.86	2.64	5.02	1.90	Corn, oats and oat middlings.	As certified,	1065
3.63	3.5-4.5	8.34	6-8	31.00	White corn, oats, barley, wheat flour, oat middlings, oat groats and oat hulls.	As certified,	133
4.00	3.5-4.5	8.22	6-8	1.60	White corn, oats, barley, oat middlings, oat groats and oat hulls.	As certified,	296
4.02	3.5-4.5	8.46	6-8	1.60	White or yellow corn, oats, barley, corn meal mill by-products, (fine meal and siftings), oat meal by-products, (oat groats, oat middlings and oat hulls), and $\frac{1}{2}$ of 1 per cent. fine salt.	Corn, oats, corn meal and siftings, oat groats, oat middlings, oat hulls and salt.	900
m							
4.19	3.5-4.5	7.33	6-8	1.75	White or yellow corn, oats, barley, corn meal mill by-products, (fine meal and siftings), oat meal by-products, (oat groats, oat middlings and oat hulls), and $\frac{1}{2}$ of 1 per cent. fine salt.	Corn, oats, corn meal and siftings, oat groats, oat middlings, oat hulls and salt.	836
4.18	3.5-4.5	7.57	6-8	1.70	White or yellow corn, oats, barley, corn meal mill by-products, (fine meal and siftings), oat meal by-products, (oat groats, oat middlings and oat hulls), and $\frac{1}{2}$ of 1 per cent. fine salt.	Corn, oats, corn meal and siftings, oat groats, oat middlings, oat hulls and salt.	622
4.10	.....	7.92	.....	1.66			
3.61	3-4	8.72	7-9	1.70	White corn, oats, corn meal mill by-products, (fine meal and siftings), oat meal by-products, (oat groats, oat middlings and oat hulls), of 1 per cent. fine salt.	As certified,	742
3.39	3-4	9.29	7-9	30.00	Yellow or white corn, oats, oat middlings, oat groats, and oat hulls.	As certified	131
2.91	3-4	6.32	7-9	1.50	White or yellow corn, oats, corn meal mill by-product (fine meal and siftings), oat meal by-products, (oat groats, oat middlings, oat hulls) and $\frac{1}{2}$ of 1 per cent. salt.	As certified	187

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
732	Camp's Little Wonder Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	Lock Haven, F. H. Dyer.	732	Per ct. 9.70	Per ct. 9.25	Per ct. 7-8
639	Camp's Little Wonder Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	St. Marys, Hall, Kaul & Hyde Co.	639	10.61	8.31	7-8
487	Camp's Little Wonder Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	New Brighton, J. H. Hornby & Sons.	487	10.23	8.75	7-8
191	Camp's Little Wonder Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	Everett, J. & C. Howard,	191	11.17	8.44	7-8
1209	Camp's Little Wonder Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	Blairsville, J. A. McKelvey.	1209	9.43	9.50	7-8
1111	Camp's Little Wonder Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	Charleroi, R. C. Mountser	1111	9.07	9.06	7-8
363	Camp's Little Wonder Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	Clearfield, J. T. Murphy,	363	10.00	8.75	7-8
500	Camp's Little Wonder Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	Rochester, Rochester Seed & Supply Co.	500	9.62	10.31	7-8
362	Camp's Little Wonder Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	Munson Station, Jacob Smutzinger.	362	9.71	8.50	7-8
743	Camp's M. D. Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	Average, Lock Haven, M. L. Claster	743	10.07 9.90	9.00 9.13	..... 7-9

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 3.56	Per ct. 3-4	Per ct. 8.06	Per ct. 7-9	Per ct. 1.65	White corn, oats, corn meal by-products, (fine meal and siftings), oat meal by-products, (oat groats, oat middlings, oat hulls) and $\frac{1}{2}$ of 1 per cent. fine salt.	As certified,	732
3.31	3-4	9.09	7-9	1.80	White or yellow corn, oats, corn meal mill by-products, (fine meal and siftings), oat meal by-products, oat groats, oat middlings, oat hulls) and $\frac{1}{2}$ of 1 per cent. fine salt.	As certified,	639
3.95	3-4	8.10	7-9	1.50	White or yellow corn, oats, corn meal mill by-products, (fine meal and siftings), oat meal by-products, oat groats, oat middlings, oat hulls) and $\frac{1}{2}$ of 1 per cent. fine salt.	As certified,	487
3.88	3-4	7.84	7-9	1.60	White or yellow corn, oats, corn meal mill by-products, (fine meal and siftings), oat meal by-products, oat groats, oat middlings, oat hulls) and $\frac{1}{2}$ of 1 per cent. fine salt.	As certified,	191
4.88	3-4	7.44	7-9	1.70	Yellow corn, oats, oat middlings, oat groats and oat hulls.	As certified,	1209
4.27	3-4	7.45	7-9	1.05	White or yellow corn, oats, corn meal mill by-products, (fine meal and siftings), oat meal by-products, (oat groats, oat middlings, oat hulls), and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	1111
3.92	3-4	7.17	7-9	1.80	Yellow or white corn, oats, oat middlings, oat groats and oat hulls.	As certified,	368
4.40	3-4	7.41	7-9	1.60	White or yellow corn, oats, corn meal mill by-products, (fine meal and siftings), oat meal by-products, (oat groats, oat middlings, oat hulls), and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	500
3.50	3-4	8.38	7-9	1.75	White or yellow corn, oats, corn meal mill by-products, (fine meal and siftings), oat meal by-product, (oat groats, oat middlings, oat hulls), and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	362
3.91 3.82	..... 3.5-4.5	7.93 8.27	..... 7-9	32.92 1.75	White corn, oats, corn meal mill by-product, (fine meal and siftings) oat meal by-product, (oat groats, oat middlings, oat hulls) and $\frac{1}{2}$ of 1 per cent. fine salt.	As certified,	713

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
130	Camp's M. D. Chop Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	South Fork, J. E. Crisman.	130	Per ct. 10.48	Per ct. 9.13	Per ct. 7-9
		Average,		10.19	9.13	.....
754	Standard Chop, C. Y. Wagner, Bellefonte, Pa.	Bellefonte, C. Y. Wagner	754	11.20	11.56	10-13
918	Byrite Chop, George Walter & Sons, Butler, Pa.	Butler, George Walter & Sons.	918	11.63	10.13	6-10
851	No. 1 Chop, L. E. Yagel, Millmont, Pa.	Millburg, Union Hardware Co.	851	10.45	9.19	8.00
MISCELLANEOUS CHOP FEEDS.						
CORN CHOPS.						
458	B. Corn Meal, Globe Elevator Co., Buffalo, N. Y.	Manassas, B. W. & M. F. Rose Co.	458	14.30	9.19	8-9
937	Corn Meal, Mystic Milling & Feed Co., Rochester, N. Y.	Troy, Farmers' & Consumers' Commercial Co.	937	12.65	8.38	.....
290	Camp's Yellow Corn Meal, The Toledo Grain & Milling Co., Toledo, Ohio.	McKeesport, Keystone Commercial Co.	290	11.76	8.69	.....
		Average,		12.10	8.99	.....
341	..... Barley Foods Co., Morgantown, W. Va.	Uniontown, J. F. Hogsett & Son.	341	9.46	13.25	.....
CORN AND OAT CHOPS.						
461	Justice Brand Corn and Oats 1 and 1 crushed, Consolidated Milling Corporation, Buffalo, N. Y.	Wellsboro, R. J. Dunham,	461	10.09	10.56	.....
676	Corn and Oats Chop, Dayton Milling Co., Towanda, Pa.	Williamsport, Gohl & Kling,	676	11.23	10.33	.....
1204	Corn and Oats Chop, David Ellis & Son, Indiana, Pa.	Indiana, David Ellis & Son.	1204	10.31	11.33	.....
78	Corn and Oats Chop, Levan & Sons, Columbia, Pa.	Lancaster, Levan & Sons,	78	10.75	11.63	.....
469	Corn and Oats Chop, Monaca Roller Mills, Monaca, Pa.	Monaca, Monaca Roller Mills.	469	11.53	9.81	.....
805	Corn and Oats Chop, Patton & Daugherty, Reynoldsville, Pa.	Reynoldsville Patton & Daugherty.	805	11.07	11.50	.....
407	Corn and Oats Chop, Port Allegany Milling Co., Port Allegany, Pa.	Port Allegany, Port Allegany Milling Co.	407	11.61	10.19	.....
934	Corn and Oats Chop, Preston & Jacquish, Troy, Pa.	Troy, Preston & Jacquish,	934	11.02	11.12	.....
423	Corn and Oats Feed, H. Z. Pride & Son, Westfield, Pa.	Westfield, H. Z. Pride & Son.	423	10.63	10.33	.....
1193	Corn and Oats Chop, George L. Reed Milling Co., Brookville, Pa.	Brookville, George L. Reed Milling Co.	1193	10.33	9.81	.....
908	Corn and Oats Chop, B. F. Shannon & Co., Butler, Pa.	Butler, B. F. Shannon & Co.	908	11.46	11.12	.....
385	Corn and Oats Chop, John W. Smith & Bro., Clearfield, Pa.	Clearfield, John W. Smith & Bro.	385	13.73	9.44	.....
452	Corn and Oat Feed, Sun Milling Co., Mansfield, Pa.	Mansfield, Sun Milling Co.	452	10.53	10.31	.....
275	Mixed Chop, J. G. Wanner Est., Stony Creek, Pa.	Mt. Pean, Nein Frothers,	275	12.08	9.50	.....
		Average,		11.27	10.53	.....
CORN, OATS AND BARLEY CHOPS.						
366	Unn. Oats and Barley Chop, John W. Eberts, Clearfield, Pa.	Clearfield, John W. Eberts.	366	14.65	10.00	.....

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.02	Per ct. 3.5-4.5	Per ct. 7.85	Per ct. 7-9	Per ct. 30.00	White or yellow corn, oats, oat middlings, oat groats and oat hulls.	As certified,	130
3.92	8.06	.....	33.50			
4.02	3-4	5.52	5-7	35.00	Corn, barley, oats and middlings.	As certified,	754
4.13	2-4	4.02	4-10	1.95	Wheat screenings, oats and corn.	As certified,	918
4.12	2.00	3.94	6.00	1.60	Corn ears, corn and oats.	As certified,	851
3.78	3-4	1.97	3-4	32.00	Made from corn.	Corn chop. (Sample damp and musty.)	458
3.43	2.24	.....	1.75	.....	Corn chop,	937
3.89	4.62	.....	1.85	.....	Corn chop,	299
3.70	2.94	.....	24.67	.....	
4.24	11.91	.....	.....	.....	Barley chop,	941
4.63	4.45	.....	1.85	.....	Corn and oats,	451
4.32	4.92	.....	1.85	.....	Corn, oats and small amount of buckwheat.	676
6.03	4.07	.....	2.00	Pure grain chop,	Corn and oats,	1204
4.69	6.20	.....	27.00	.....	Corn and oats,	78
4.37	5.60	.....	1.75	.....	Corn and oats,	469
4.37	5.12	.....	1.80	Corn and oats,	As certified,	805
4.48	5.03	.....	1.90	.....	Corn and oats,	407
4.85	4.47	.....	1.90	Corn and oats,	As certified,	934
4.55	5.08	.....	1.90	Corn and oats,	As certified,	423
4.52	4.25	.....	1.70	Corn and oats,	As certified,	1193
4.63	4.23	.....	1.85	Corn and oats	As certified,	908
3.89	2.14	.....	1.75	Corn and oats, ..	As certified,	385
4.61	5.50	.....	36.00	Corn and oats, ..	As certified,	452
4.56	2.89	.....	1.80	.....	Corn and oats,	175
4.64	4.57	.....	36.71	.....	
3.98	2.19	.....	1.70	Corn, oats and barley.	As certified,	386

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
949	Cow Chop, Klepser Brothers, Martinsburg, Pa.	Altoona, Klepser Brothers,	949	Per ct. 11.85	Per ct. 10.19	Per ct. 7.00
615	Corn, Oats and Barley Chop, Lanson Brothers, Tionesta, Pa.	Tionesta, Lanson Brothers.	615	12.26	11.69	.....
637	Fresh Ground Mixed Feed, McCauley, McKay & Co., Brockwayville, Pa.	Brockwayville, McCauley McKay & Co.	637	12.04	10.81	7-10
	Average,			12.70	10.69	.....
CHOP FEEDS.						
736	Mixed Chop, W. N. Brosna, Jersey Shore, Pa.	Jersey Shore, W. N. Brosna.	736	10.11	10.69	7-12
686	Mixed Chop, City Flouring Mills, Inc., Muncy, Pa.	Muncy, City Flouring Mills, Inc.	686	9.60	9.13	7.19
868	Fresh Ground Chop, City Roller Mills, New Castle, Pa.	New Castle, City Roller Mills.	868	10.96	10.19	6.00
1206	Mixed Chop, David Ellis & Son, Indiana, Pa.	Indiana, David Ellis & Son.	1206	10.30	12.56	.....
195	Fresh Ground Mixed Chop, P. B. Furry, Loysburg, Pa.	Everett, A. H. Whetstone,	195	14.46	8.88	5.23
757	Mixed Chop, Gamble, Gheen & Co., Bellefonte, Pa.	Bellefonte, Gamble Gheen & Co.	757	12.40	11.88	11-14
1047	Chop, Gibbs Milling Co., Nanticoke, Pa.	Nanticoke, Gibbs Milling Co.	1047	10.89	10.88	10.50
1034	Rye Mixed Chop, Hazleton Mercantile Co., Hazleton, Pa.	Hazleton, Hazleton Mercantile Co.	1034	10.72	10.06	5.10
194	Fresh Ground Mixed Chop, G. B. Hoover, Woodbury, Pa.	Everett, A. H. Whetstone.	194	10.57	10.25	9.00
1018	Corn and Oats Chop, C. P. Matthews & Sons, Inc., Scranton, Pa.	Wilkes-Barre, C. P. Matthews & Sons, Inc.	1018	11.14	11.69	7-9
1029	Mixed Chop, Miner-Hillard Milling Co., Wilkes-Barre, Pa.	Wilkes-Barre, Miner-Hillard Milling Co.	1029	10.82	9.69	7-10
247	Mixed Chop, George W. Wertz, Wernersville, Pa.	Reading, George W. Wertz.	247	10.22	12.44	11.00
691	Mixed Chop, Tyrone Milling Co., Tyrone, Pa.	Tyrone, Tyrone Milling Co.	691	11.43	11.56	9.06
MISCELLANEOUS FEEDS.						
438	Wheat Screenings Meal, Deerfield Milling Co., Knoxville, Pa.	Knoxville, Deerfield Milling Co.	438	7.56	17.12	15-17.25
669	Oswego Corn Meal, Oswego Milling Co., Oswego, N. Y.	Williamsport, P. W. Dawson & Son.	669	12.68	10.00	.....
PROPRIETARY POULTRY FOODS.						
415	Mixed Chicken Feed, Acme Milling Co., Olean, N. Y.	Coudersport, Gates Brothers.	415	11.94	11.25	.....

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct.	Per ct.	Per ct.	Per ct.	Per ct.			
3.93	3.00	3.34	9.00	1.85	Corn, oats and barley.	As certified,	949
3.47	.....	3.93	.....	1.80	Corn, oats and barley.	As certified,	615
4.08	2-4	4.15	5-6	1.80	Pure corn, oats and barley.	As certified,	637
3.85	.....	3.40	.....	1.79			
4.53	3-5	5.33	4-8	1.70	Ear corn, oats, barley, screenings of grain and possibly wheat by-products.	Ear corn, oats, barley, and ground grain screenings.	736
3.81	3.30	11.60	9.00	1.60	Wheat middlings, corn ear chop and oat feed.	Corn ear chop, barley, wheat middlings, oat middlings and oat hulls.	686
4.68	4.00	4.68	12.00	34.00	Corn, rye, oats and wheat screenings.	Corn, oats, rye, wheat screenings and small amount of milo maize and buckwheat.	868
4.56	.....	4.16	.....	1.75	Pure grains,	Corn, oats, barley, buckwheat, Kafir corn, wheat bran and middlings, rye bran and middlings and small amount ground grain screenings.	1205
3.35	2.85	7.01	.....	1.75	.....	Corn, oats, small amount of wheat bran and wheat middlings and large amount of corn glumes and cleanings.	195
4.07	3-5	3.53	4.00	1.90	Corn, oats, shorts, screenings and bran.	As certified,	757
4.13	6.86	5.42	5.20	1.95	Corn, oats and oat feed.	Corn, oats, buckwheat, oat middlings and oat hulls.	1047
6.08	2-4	7.23	3-9	1.55	Rye feed, hominy and oat hulls.	As certified,	1034
4.51	4.00	8.11	.....	1.75	.....	Corn, oats, wheat bran and middlings.	194
5.33	3-5	4.28	6-7	28.00	Corn, oats, hominy and oat hulls.	Corn, oats, oat hulls, hominy feed and malt sprouts.	1018
3.66	2-5	4.06	5-7	1.90	Corn, wheat, middlings and oat hulls.	As certified,	1029
3.14	3.00	4.10	4.50	1.90	Corn, oats, rye and middlings.	As certified,	247
3.73	3.50	4.02	2.90	35.00	Corn, Kafir corn, oats, barley, rye and wheat feed.	As certified,	691
7.89	5-7.38	7.31	6.96-9	25.00	Composed of wheat screenings.	Ground wheat screenings meal.	438
4.53	.....	2.56	.....	1.50	Fine siftings from corn.	As certified,	669
3.15	.. ..	2.85	.....	2.15	.....	Cracked corn, oats, wheat, barley, buckwheat, Kafir corn, sunflower seed and small amount whole weed seeds.	415

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
947	Adler's Poultry Feed, S. O. Adler & Sons, Altoona, Pa.	Altoona Mills. Altoona Feed	947	Per ct. 12.51	Per ct. 9.76	Per ct. 8-10
1223	Poultry Mash, A. P. Allen, Erie, Pa.	Erie, A. P. Allen,.....	1223	9.57	16.13	11-14
109	Cluck Cluck Scratch Feed, American Milling Co., Peoria, Ill.	Harrisburg, Mock & Hartman.	109	12.35	11.69	10.00
657	Cluck Cluck Scratch Feed, American Milling Co., Peoria, Ill.	Ridgway, Charles O. Salberg.	657	13.01	10.50	10.00
		Average, .....	.....	12.33	11.10	.....
660	Sucrene Chick Feed, American Milling Co., Peoria, Ill.	Ridgway, Charles O. Salberg.	660	13.13	10.33	10.00
8	Hen-O-La Scratch Feed, * Anderson Brothers & Co., York, Pa.	York, Anderson Brothers & Co.	8	12.31	10.33	9.00
7	Must Lay Mash, Anderson Brothers & Co., York, Pa.	York, Anderson Brothers & Co.	7	10.33	13.33	13.00
207	O-Er-Lay Poultry Feed with Grit and Charcoal, J. J. Badenoch Co., Chicago, Ill.	Lebanon, E. Strickler Sons.	207	10.47	10.75	9.50
1051	Chicken Mash, Bergin & Co., Nanticoke, Pa.	Nanticoke, Bergin & Co.,	1051	9.64	16.33	13-14
504	Blended Hen Food, Blank & Gottshall, Sunbury, Pa.	Sunbury, Blank & Gottshall.	504	12.35	10.25	8-10.5
693	Blended Hen Food, Blank & Gottshall, Sunbury, Pa.	Lewistown, H. C. Jackson Supply Co.	693	12.50	10.56	8-10.5
		Average, .....	.....	12.42	10.41	.....
503	Chick Food Invigorator, Blank & Gottshall, Sunbury, Pa.	Sunbury, Blank & Gottshall.	503	11.53	10.44	8-10.5

FEEDING STUFFS COLLECTED IN 1915.—Continued

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 3.57	Per ct. 3.5-4	Per ct. 2.80	Per ct. 4-6	Per ct. 2.25	Cracked corn, wheat, barley, buckwheat and oats.	As certified,	947
4.57	2-4	9.05	15.00	1.80	Corn meal, wheat bran, wheat and rye shorts, alfalfa meal, oil meal, ground oats, bone meal, cottonseed meal, gluten feed, barley, oat shorts, oat hulls, oat middlings and 1/2 of 1 per cent. salt.	As certified,	1282
3.45	2.50	2.99	5.00	2.10	Corn, wheat, barley, Kafir corn, sunflower seed, buckwheat and linseed oil cake.	Corn, wheat, barley, Kafir corn, milo maize, buckwheat, flaxseed, linseed oil meal and trace whole weed seeds.	100
3.43	2.50	3.11	5.00	2.15	Corn, wheat, barley, Kafir corn, sunflower seed and buckwheat.	As certified,	657
3.44	.....	3.02	.....	2.13			
2.93	2.50	2.21	5.00	2.60	Corn, Kafir corn, wheat and millet.	Corn, Kafir corn, barley, wheat, millet and small amount whole weed seeds.	600
3.14	3.00	2.87	4.00	41.00	Oats, corn, wheat, Kafir corn, buckwheat, sunflower seed and hen-e-ta.	Corn, oats, wheat, Kafir corn, milo maize, buckwheat, sunflower seed and hen-e-ta bone grit.	8
6.24	4.50	3.04	7.00	40.00	Wheat bran, wheat middlings, gluten, oil meal, alfalfa, corn chop, oats chop, meat scrap and fish scrap.	As certified,	7
2.60	2.50	2.89	5.00	2.20	Wheat, cracked, corn, Kafir corn, barley, oats, sunflower seed and not over 4 per cent. grit, and 1 per cent. charcoal.	Cracked corn, Kafir corn, wheat, oats, barley, sunflower seed, small amount whole weed seeds, grit and charcoal.	207
5.00	2-4	6.86	4-6	2.00	Oats, charcoal, gluten, wheat middlings, hen-e-ta, wheat bran, corn meal, beef scraps, fish scraps, and salt.	As certified,	1051
3.43	2.25-3	3.85	2.5-3.5	41.00	Cracked corn, wheat, Kafir corn, buckwheat, barley, sunflower, hen-e-ta bone and charcoal.	Cracked corn, wheat, barley, buckwheat, Kafir corn, sunflower seed, hen-e-ta bone grit, charcoal and small amount whole weed seeds.	504
3.55	2.25-3	3.05	2-3.75	2.25	Cracked corn, wheat, Kafir corn, buckwheat, barley, sunflower, hen-e-ta bone and charcoal.	Cracked corn, oats, wheat, barley, buckwheat, Kafir corn, flaxseed, hen-e-ta bone grit, charcoal, sunflower seed and small amount whole weed seeds.	693
3.49	.....	3.45	.....	43.00			
2.53	2.25-3	2.07	2.5-3.25	48.00	Cracked, corn, wheat, millet, hen-e-ta grit, cracked peas, Kafir corn, milo maize and cut oats.	Cracked corn, wheat, millet, Kafir corn, milo maize, cut oats, cracked peas, hen-e-ta bone grit and trace whole weed seeds.	503

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
506	Developing Food, Blank & Gottshall, Sunbury, Pa.	Sunbury, Blank & Gottshall.	506	Per ct. 12.00	Per ct. 10.25	Per ct. 10-11.6
506	Hen-O-La Scratch Food, Blank & Gottshall, Sunbury, Pa.	Sunbury, Blank & Gottshall.	506	11.16	9.25	9-10
507	B. & G's Mash Food, Blank & Gottshall, Sunbury, Pa.	Sunbury, Blank & Gottshall.	507	7.85	14.75	15-16
694	B. & G's Mash Food, Blank & Gottshall, Sunbury, Pa.	Lewistown, H. C. Jackson Supply Co.	694	8.16	15.44	15-16
		Average, .....	.....	8.00	15.10	.....
11	Blatchford's Fill The Basket Egg Mash, The Blatchford Calf Meal Factory, Waukegan, Ill.	York, H. H. Smyser,	11	8.96	19.06	19.00
719	Blatchford's Fill The Basket Egg Mash, The Blatchford Calf Meal Factory, Waukegan, Ill.	Lewistown, Spanogle-Yeager Milling Co.	719	8.13	19.75	19.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 3.34	Per ct. 2.5-3.5	Per ct. 2.41	Per ct. 1.5-2.5	Per ct. 43.00	Wheat, cracked corn, Kafir corn, millet and hulled oats.	Cracked corn, hulled oats, Kafir corn, milo maize, millet and trace whole weed seeds.	606
2.86	2-3	3.37	3-4	40.00	Cracked corn, whole wheat, Kafir corn, buckwheat, sunflower seed, hen-e-ta bone and barley.	Cracked corn, whole wheat, Kafir corn, milo maize, buckwheat, sunflower seed, barley and hen-e-ta bone grit.	505
4.04	3-4	5.65	4-5	43.00	Corn meal, middlings, bran, gluten meal, pea meal, alfalfa meal, fish scrap, meat meal and hen-e-ta.	Corn meal, wheat and and rye middlings, wheat bran, corn gluten meal, pea meal, alfalfa meal, fish scrap, meat meal and hen-e-ta bone grit.	507
3.65	2-4	5.25	4-5	2.40	Corn meal, middlings, bran, gluten meal, pea meal, alfalfa meal, fish scrap, meat meal and hen-e-ta.	As certified,	691
3.83	.....	5.45	.....	45.50			
4.11	4.00	9.57	10.00	2.75	Blatchford's calf meal, (locust bean meal, unpressed flaxseed, wheat flour, barley meal, ground beans and peas, old process oil meal, cocoa shell meal, coconut meal, re-cleaned cottonseed meal, fuenugreek, dried milk, anise and salt.) Also alfalfa, barley, bone, corn and oat meals, wheat bran, wheat middlings, beef scraps, fish, capicum and powdered limestone.	As certified,	11
4.00	4.00	9.52	10.00	2.20	Blatchford's calf meal, (locust bean meal, unpressed flaxseed, wheat flour, barley meal, ground beans and peas, old process oil meal, cocoa shell meal, coconut meal, re-cleaned cottonseed meal, fuenugreek, dried milk, anise and salt.) Also alfalfa, barley, bone, corn and oat meals, wheat bran, wheat middlings, beef scraps, fish, capicum and powdered limestone.	As certified,	719

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
242	Blatchford's Fill The Basket Egg Mash, The Blatchford Calf Meal Factory, Waukegan, Ill.	Reading, Aug. O. Werts & Bro.	242	Per ct. 9.20	Per ct. 19.13	Per ct. 19.00
		Average,		8.76	19.31	.....
723	Blatchford's Milk Mash, The Blatchford Calf Meal Factory, Waukegan, Ill.	Lewistown, Spanogle-Yeager Milling Co.	723	8.73	20.38	20.00
766	Blatchford's Milk Mash, The Blatchford Calf Meal Factory, Waukegan, Ill.	Titusville, Kerr Hill Mill Mill Co., Ltd.	766	9.24	20.38	20.00
244	Blatchford's Milk Mash, The Blatchford Calf Meal Factory, Waukegan, Ill.	Reading, Aug. O. Werts & Bro.	244	9.27	19.19	20.00
		Average,		9.08	19.65	... ..
371	Truquois Chick Feed, Buffalo Cereal Co., Buffalo, N. Y.	Clearfield, J. T. Murphy,	371	12.10	11.31	10-12

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.28	Per ct. 4.00	Per ct. 9.20	Per ct. 10.00	Per ct. 2.50	Blatchford's calf meal, (locust bean meal, unpressed flaxseed, wheat flour, barley meal, ground beans and peas, old process oil meal, cocoa shell meal, coconut meal, re-cleaned cottonseed meal, foenugreek, dried milk, anise and salt.) Also alfalfa, barley, bone, corn and oat meals, wheat bran, wheat middlings, beef scraps, fish, capsicum and powdered lime- stone.	As certified,	242
4.12	.....	9.53	.....	2.48			
4.45	4.00	7.53	7.50	2.00	Blatchford's calf meal, (locust bean meal, unpressed flaxseed, wheat flour, barley meal, ground beans and peas, rice polish, old process oil meal, cocoa shell meal, co- conut meal, re- cleaned cottonseed meal, foenugreek, dried milk, anise and salt.) Also bone, corn and oat meals, wheat middlings, beef scraps, fish and powdered limestone.	As certified,	722
5.12	4.00	6.82	7.50	2.75	Blatchford's calf meal, (locust bean meal, unpressed flaxseed, wheat flour, barley meal, ground beans and peas, rice polish, old process oil meal, cocoa shell meal, co- conut meal, re- cleaned cottonseed meal, foenugreek, dried milk, anise and salt.) Also bone, corn and oat meals, wheat middlings, beef scraps, fish and powdered limestone.	As certified,	706
3.93	4.00	6.01	7.50	3.00	(Bean, coconut, cot- tonseed, flaxseed, lo- cust bean, linseed oil and pea meals, foenugreek, wheat flour, dried milk, co- coa shells and salt.) Also alfalfa, barley, bone, corn, oat meal, wheat bran, wheat middlings, beef scraps, fish, capsi- cum and limestone grit.	As certified,	244
4.50	.....	6.78	.....	2.73			
2.86	2-3	1.75	3.00	2.40	Corn, wheat, Kaffir corn, peas and millet.	Corn, wheat, Kaffir corn, peas, millet and trace whole weed seeds.	371

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.		
					Found.	Guaranteed.	
877	Chamberlain's Perfect Brand Chick Feed, F. B. Chamberlain Co., St. Louis Mo.	Pittsburgh, The I. W. Scott Co.	877	Per ct. 10.86	Per ct. 11.56	Per ct. 9.00	
685	Chick Food, City Flouring Mills, Inc., Muncy, Pa.	Muncy, City Flouring Mills, Inc.	685	11.78	9.38	8-10	
684	Hen Food, City Flouring Mills, Inc., Muncy, Pa.	Muncy, City Flouring Mills, Inc.	684	12.11	10.13	.....
760	Superior Chick Food, E. D. Clark, Altoona, Pa.	Altoona, E. D. Clark,	760	11.88	10.56	8.00	
759	Superior Hen Food, E. D. Clark, Altoona, Pa.	Altoona, E. D. Clark,	759	11.10	9.63	8.00	
810	Corno Chick Feed, The Corno Mills Co., St. Louis, Mo.	Greensburg, D. F. Kilgore & Co.	310	13.14	10.50	10.7	
525	Chick Food, Danville Milling Co., Danville, Pa.	Danville, Danville Milling Co.	525	11.97	9.75	7-9.5	
526	The Great Egg Producer, Danville Milling Co., Danville, Pa.	Danville, Danville Milling Co.	526	9.33	22.19	25.10	
524	Hen Food, Danville Milling Co., Danville, Pa.	Danville, Danville Milling Co.	524	12.33	10.25	7-9.5	
441	Deerfield Chicken Mash, Deerfield Milling Co., Knoxville, Pa.	Knoxville, Deerfield Milling Co.	441	10.30	19.31	14-15	
470	Globe Chick Feed, The Albert Dickinson Co., Chicago, Ill.	Monaca, Monaca Roller Mills.	470	12.29	11.56	10.00	
577	Globe Chick Feed, with Grit, The Albert Dickinson Co., Chicago, Ill.	Kittanning, J. A. Gault & Co.	577	11.25	10.50	10.00	
578	Globe Developing Feed, with Grit, The Albert Dickinson Co., Chicago, Ill.	Kittanning, J. A. Gault & Co.	578	11.71	10.25	10.00	
1179	Globe Egg Mash, The Albert Dickinson Co., Chicago, Ill.	Turtle Creek, F. J. Riddle.	1179	10.12	15.63	16.00	
287	Globe Scratch Feed, The Albert Dickinson Co., Chicago, Ill.	Greensburg, McFarland Supply Co.	287	12.90	11.63	10.00	

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Pound.	Guaranteed.	Pound.	Guaranteed.				
Per ct. 3.09	Per ct. 2.50	Per ct. 3.53	Per ct. 3.00	Per ct. 2.96			
					Kaffir, wheat, meat, bone, charcoal, millet, grit and mixed broken grains from wheat screenings.	Kaffir corn, milo maize, oats, wheat, millet, flaxseed, meat, bone charcoal, grit mixed broken grains from wheat screenings containing large amount of whole weed seeds.	877
2.74	3-4	1.73	22.79	.30	Cracked corn, cracked Kaffir corn, cracked wheat, millet seed and fine oyster shells.	Cracked corn, cracked Kaffir corn, cracked wheat, millet, hen-e-ta bone grit and small amount whole weed seeds.	685
4.56	.....	4.04	.....	2.00	Wheat, cracked corn, buckwheat, and Kaffir corn.	Cracked corn, Kaffir corn, wheat, rye and buckwheat.	684
3.58	2.00	1.82	15.00	2.10	Cracked corn, Kaffir corn, millet, grit, oyster shell and wheat.	As certified,	760
3.06	2.00	2.72	5.00	2.00	Cracked corn, buck-wheat, Kaffir corn, barley, milo maize, oats, wheat, sunflower seed, grit and oyster shell.	As certified,	759
3.32	2.75	2.39	3.00	2.25	Wheat, corn, Kaffir corn and millet seed.	Wheat, corn, Kaffir corn, milo maize and millet.	310
2.54	2-2.7	2.50	2.25-3	2.40	Cracked corn, milled, Kaffir corn, charcoal, grit and cracked peas.	Cracked corn, millet Kaffir corn, milo maize, cracked peas charcoal and grit.	525
6.16	5.31	5.82	5.73	2.00	Corn meal, middlings, bran, alfalfa, oil meal, beef scraps, and $\frac{1}{2}$ of 1 per cent. salt.	Corn meal, wheat middlings, wheat bran, alfalfa, cocoa hulls, linseed oil meal, beef scrap and salt.	526
3.00	2-2.75	4.14	2-2.75	2.00	Cracked corn, wheat, oats, Kaffir corn, sunflower seed, charcoal and buckwheat.	Cracked corn, wheat, oats, rye, Kaffir corn buckwheat, sunflower seed and charcoal.	524
3.95	3-4.5	8.37	8-9	1.80	Corn, oats, wheat bran, middlings, oil meal and Buffalo gluten.	As certified,	441
3.76	2.50	3.17	5.00	2.25	Corn, wheat, Kaffir corn, hulled oats and and millet.	Corn, wheat, Kaffir corn, milo maize, hulled oats, millet and small amount whole weed seeds.	470
3.60	2.50	3.08	5.00	2.25	Corn, wheat, Kaffir corn, hulled oats, millet and grit.	As certified,	577
2.94	2.50	3.02	5.00	2.20	Corn, wheat, Kaffir corn, hulled oats, buckwheat, millet and grit.	Corn, wheat, Kaffir corn, milo maize, buckwheat, hulled oats, millet and grit.	578
4.95	3.00	6.68	10.00	2.50	Alfalfa meal, bran, middlings, wheat meal, corn feed meal, ground corn bran, linseed oil cake, meat scraps and salt $\frac{1}{2}$ of 1 per cent.	As certified,	1179
3.53	2.59	2.76	5.00	2.25	Corn, wheat, rye, barley, oats, Kaffir corn, buckwheat, sunflower and oil cake.	Corn, oats, wheat, rye, barley, buckwheat, Kaffir corn, milo maize, sunflower seed, linseed oil cake and small amount whole weed seeds.	287

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
579	Globe Scratch Feed, No Grit, The Albert Dickinson Co., Chicago, Ill.	Kittanning, J. A. Gault & Son.	579	Per ct. 12.78	Per ct. 11.25	Per ct. 10.00
329	Globe Scratch Feed, No Grit, The Albert Dickinson Co., Chicago, Ill.	Uniontown, King Brothers.	329	12.95	11.28	10.00
		Average,		12.87	11.42	.....
480	Pine Tree Scratch Feed, No Grit, The Albert Dickinson Co., Chicago, Ill.	Beaver Falls, Dodds & Garrett.	480	12.62	10.44	10.00
580	Pine Tree Scratch Feed, No Grit, The Albert Dickinson Co., Chicago, Ill.	Kittanning, J. A. Gault & Co.	580	11.56	11.56	10.00
		Average,		12.59	11.00	.....
1256	White Cross Scratch Feed, No Grit, The Albert Dickinson Co., Chicago, Ill.	Hays, John Lachman & Co.	1256	12.80	10.62	10.00
494	White Cross Scratch Feed, No Grit, The Albert Dickinson Co., Chicago, Ill.	West Bridgewater, W. W. McCullough.	494	12.21	10.62	10.00
		Average,		12.50	10.62	.....
575	Champion Brand Chick Feed with Grit, Dilworth Brothers Co., Pittsburgh, Pa.	Pittsburgh, Dilworth Brothers Co.	575	12.20	9.94	10.00
574	Champion Brand Scratch Grains, Dilworth Brothers Co., Pittsburgh, Pa.	Pittsburgh, Dilworth Brothers Co.	574	13.45	10.31	10.00
1007	Dunlap's Mash Feed, William H. Dunlap, Jr., Canonsburg, Pa.	Canonsburg, William H. Dunlap, Jr.	1007	9.28	19.06	18.00
730	Oyer's Hen Feed, F. H. Dyer, Lock Haven, Pa.	Lock Haven, F. H. Dyer,	730	12.29	12.00	11.53
821	Badan Scratch, No Grit, The Early & Daniel Co., Cincinnati, Ohio.	Carnegie Richey & Carlisle.	821	12.24	10.60	10.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 3.47	Per ct. 2.50	Per ct. 3.20	Per ct. 6.00	Per ct. 2.10	Corn, wheat, barley, oats, Kafir corn, buckwheat, sunflower and oil cake.	Corn, wheat, barley, oats, Kafir corn, milo maize, buckwheat, sunflower seed and linseed oil cake.	579
3.24	2.50	2.62	5.00	2.25	Corn, wheat, barley, oats, Kafir corn, buckwheat, sunflower and oil cake.	Corn, wheat, barley, oats, Kafir corn, milo maize, buckwheat, sunflower seed, linseed oil cake and small amount whole weed seeds.	329
3.43	.....	2.86	.....	2.20			
3.70	2.50	2.50	5.00	2.10	Corn, wheat, buckwheat, barley, oats, Kafir corn and sunflower.	Corn, wheat, buckwheat, barley, oats, Kafir corn, milo maize and sunflower seed.	490
3.39	2.50	2.62	5.00	2.05	Corn, wheat, buckwheat, rye, barley, oats, Kafir corn and sunflower.	Corn, wheat, buckwheat, rye, barley, oats, Kafir corn, milo maize, sunflower seed and trace of whole weed seeds.	530
3.55	.....	2.56	.....	2.08			
3.22	2.50	2.44	5.00	1.80	Wheat, barley, oats, Kafir corn, buckwheat and sunflower.	As certified,	1256
3.50	2.50	2.52	5.00	2.10	Corn, wheat, rye, barley, oats, Kafir corn, buckwheat and sunflower.	Corn, wheat, rye, barley, oats, Kafir corn, milo maize, buckwheat and sunflower seed.	494
3.36	.....	2.48	.....	1.95			
3.67	2.50	2.44	5.00	2.30	Cracked wheat, cracked Kafir corn, cracked Indian corn, whole millet seed, oatmeal, wild buckwheat with not to exceed 1/2 of 1 per cent. miscellaneous wild seeds occurring in above seeds and grains, charcoal and marble grit.	Cracked wheat, cracked Indian corn, cracked Kafir corn, whole millet, hulled oats, flaxseed, charcoal, marble grit and large amount of whole weed seeds.	575
3.54	2.50	2.96	5.00	2.15	Whole wheat, whole barley, cracked Indian corn, whole Kafir corn, whole oats, Sunflower seed, and re-cleaned wheat screenings.	Wheat, barley, cracked Indian corn, Kafir corn, milo maize, oats, sunflower seed, flaxseed, wheat screenings containing large amount whole weed seeds.	574
4.55	3.50	9.94	9.00	2.25	Bran, middlings, alfalfa meal, corn and oats chop, corn meal, oil meal, gluten meal, beef scraps, charcoal and a small percentage of salt.	As certified,	1007
3.29	3.30	2.60	3.36	2.25	Cracked corn, buckwheat, parched wheat, sunflower seed and Kafir corn.	Cracked corn, oats, barley, parched wheat, buckwheat, Kafir corn, flaxseed and small amount whole weed seeds.	730
3.54	2.50	2.66	5.00	2.05	Wheat, rye, corn, oats, barley, buckwheat, Kafir corn and sunflower seed.	Wheat, rye, corn, oats, barley, buckwheat, Kafir corn, milo maize, sunflower seed and large amount whole weed seeds.	821

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
240	Triumph Mash Feed, Jonas F. Eby & Son, Lancaster, Pa.	Reading, Aug. C. Wertz & Bro.	240	Per ct. 9.63	Per ct. 23.25	Per ct. 20-22
387	Cackle Poultry Feed, Edwards & Loomis Co., Chicago, Ill.	Bradford, Smith Brothers,	387	11.69	10.31	10.00
1164	Morning Glory Scratch Feed with Grit, Shell and Charcoal, Edwards & Loomis Co., Chicago, Ill.	Homestead, Vallowe Brothers.	1164	10.76	10.75	10.00
1165	Red Comb Meat Mash with Shell and Charcoal, Edwards & Loomis Co., Chicago, Ill.	Homestead, Vallowe Brothers.	1165	10.09	16.31	15.00
609	Red Comb Poultry Feed—No Grit, Edwards & Loomis Co., Chicago, Ill.	Franklin, J. H. Lavery, ..	609	12.73	10.75	10.00
654	Red Comb Poultry Feed—No Grit, Edwards & Loomis Co., Chicago, Ill.	Ridgway, Smith Brothers Co.	654	12.61	11.25	10.00
636	Red Comb Poultry Feed—No Grit, Edwards & Loomis Co., Chicago, Ill.	DuBois, Timlin, Kelly & Co.	636	13.40	10.63	10.00
		Average, .....	.....	12.88	10.88	.....
1166	Red Comb Poultry Feed with Grit, Shell and Charcoal, Edwards & Loomis Co., Chicago, Ill.	Homestead, Vallowe Brothers.	1166	11.80	10.31	10.00
1203	Royal Meat Mash, David Ellis & Son, Indiana, Pa.	Indiana, David Ellis & Son.	1203	8.97	14.69	12-15
1202	Royal Poultry Food, David Ellis & Son, Indiana, Pa.	Indiana, David Ellis & Son.	1202	11.11	11.77	.....
744	Chick Feed—No Grit, John W. Ehlman, Lancaster, Pa.	Lock Haven, M. L. Claster.	744	12.20	10.75	10.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 6-68	Per ct. 5-8	Per ct. 6-18	Per ct. 5-4	Per ct. 2-25			
					Gluten feed, cotton-seed meal, oil cake meal, alfalfa meal, wheat middlings, wheat bran, corn chop, oats chop and beef scraps.	As certified,	240
3.55	2.50	2.38	5.00	2.00	Wheat, cracked corn, Kafir corn, barley, oats, sunflower seed, and not over 4 per cent, grit, 4 per cent, shell and 1 per cent, charcoal.	Cracked corn, oats, wheat, barley, Kafir corn, sunflower seed, grit, oyster shell, charcoal and small amount whole weed seeds.	387
7.86	2.50	2.71	5.00	2.00	Wheat, cracked corn, Kafir corn, barley, wild buckwheat, sunflower seed, and not over 4 per cent, grit, 4 per cent, shell and 1 per cent, charcoal.	Cracked corn, wheat, barley, Kafir corn, milo maize, sunflower seed, grit, oyster shell, charcoal and large amount whole weed seeds.	1164
5.06	4.00	5.88	8.00	2.25	Oat meal, oil meal, corn meal, meat scraps, wheat bran, wheat middlings, alfalfa meal and not over 5 per cent, shell and 1 per cent, charcoal.	As certified,	1165
3.53	2.50	2.59	5.00	2.25	Wheat, cracked corn, Kafir corn, barley, oats, sunflower seed and buckwheat.	Cracked (corn, oats, barley, wheat, Kafir corn, milo maize, buckwheat, sunflower seed and small amount whole weed seeds.	600
3.67	2.50	2.79	5.00	2.35	Wheat, cracked corn, Kafir corn, barley, oats, sunflower seed, and buckwheat.	As certified,	654
3.33	2.50	2.64	5.00	2.20	Wheat, cracked corn, Kafir corn, barley, oats, sunflower seed, and buckwheat.	Cracked corn, cake, barley, wheat, buckwheat, Kafir corn, milo maize, sunflower seed, grit, oyster shell, charcoal and small amount whole weed seeds.	636
3.51	.....	2.77	.....	2.27			
3.10	2.50	2.13	5.00	2.06	Wheat, cracked corn, Kafir corn, barley, oats, sunflower seed, buckwheat and not over 3 per cent, grit, 3 per cent, shell and 1 per cent, charcoal.	Cracked corn, oats, wheat, barley, buckwheat, Kafir corn, milo maize, sunflower seed, grit, oyster shell, charcoal and small amount whole weed seeds.	1166
5.02	2-5	7.38	15.00	2.50	Bran, middlings, corn chop, crushed oats, alfalfa meal, beef scraps and fish scrap.	As certified,	1203
3.06	.....	3.23	.....	2.20	Pure grains—corn grits, wheat, barley, buckwheat, oats and Kafir corn.	Corn, oats, wheat, buckwheat, barley, Kafir corn and small amount whole weed seeds.	1202
4.93	3.00	2.60	3.00	3.00	Millet seed, Kafir corn, cooked and baked wheat feed, re-cleaned ground grain screenings from wheat, hulled oats, cracked wheat, rice, flax and cracked corn.	Cracked corn, cooked and baked wheat, millet, Kafir corn, milo maize, ground grain screenings from wheat with small amount of whole weed seeds, hulled oats, wheat, rice and flaxseed.	744

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
727	Chick Feed—No Grit, John W. Eshelman, Lancaster, Pa.	Lewistown, G. M. White,	727	Per ct. 12.30	Per ct. 10.75	Per ct. 10.00
		Average, .....	.....	12.25	10.75	.....
64	Chick Feed—No Grit and Shell, John W. Eshelman, Lancaster, Pa.	Lancaster, John W. Eshelman.	64	14.61	10.75	10.00
273	Chick Feed—5 per cent. Grit, John W. Eshelman, Lancaster, Pa.	Mt. Penn. Nein Brothers.	273	13.15	10.31	10.00
65	Chick Feed—5 per cent. Grit, and Shell, John W. Eshelman, Lancaster, Pa.	Lancaster, John W. Eshelman.	65	13.98	10.00	10.00
		Average, .....	.....	13.91	10.35	.....
728	Developing Feed—No Grit, John W. Eshelman, Lancaster, Pa.	Lewistown, G. M. White,	728	12.50	10.19	10.00
67	Laying Mash for More Eggs, John W. Eshelman, Lancaster, Pa.	Lancaster, John W. Eshelman.	67	11.50	23.13	20.00
66	Pigeon Feed—No Grit, John W. Eshelman, Lancaster, Pa.	Lancaster John W. Eshelman.	66	13.61	12.12	10.00
41	Pigeon Feed—No Grit or Shell, John W. Eshelman, Lancaster, Pa.	Hanover, George Hull & Sons.	41	11.53	12.13	10.00
62	Crutch Feed—No Grit, John W. Eshelman, Lancaster, Pa.	Lancaster, John W. Eshelman.	62	14.33	10.00	10.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.21	Per ct. 3.00	Per ct. 2.45	Per ct. 3.00	Per ct. 2.50	Millet seed, Kafir corn, cooked and baked wheat feed, recleaned ground grain screenings from wheat, hulled oats, cracked wheat, rice, flax and cracked corn.	Cracked corn, cooked and baked wheat, millet, Kafir corn, milo maize, ground grain screenings from wheat with small amount of whole weed seeds, hulled oats, wheat, rice and flaxseed.	727
4.57	.....	2.54	.....	2.75			
5.24	3.00	2.32	3.00	40.00	Cracked corn, Cracked wheat, recleaned grain screenings from wheat, hulled oats, flaxseed, Kafir corn, millet, shredded wheat product and rice.	Cracked corn, Cracked wheat, hulled oats, flaxseed, Kafir corn, milo maize, millet, rice, shredded wheat by-product, grain screenings from wheat and small amount of whole weed seeds.	64
4.40	3.00	2.50	3.00	2.25	Cracked corn, cracked wheat, recleaned grain screenings from wheat, hulled oats, flaxseed, Kafir corn, millet, shredded wheat product and rice.	Cracked corn, cracked wheat, hulled oats, flaxseed, Kafir corn, millet, rice, shredded wheat by-product, grain screenings from wheat and small amount whole weed seeds.	273
4.63	3.00	2.95	3.00	20.00	Cracked corn, cracked wheat, recleaned grain screenings from wheat, hulled oats, flaxseed, Kafir corn, millet, shredded wheat product and rice.	Cracked corn, hulled oats, flaxseed, Kafir corn, milo maize, millet, rice, shredded wheat by-product, grain screenings from wheat and small amount whole weed seeds.	65
4.75	.....	2.66	.....	41.23			
3.21	3.00	1.95	3.00	2.50	Millet seed, hulled oats, rice, Kafir corn, wheat, cracked wheat and cooked and baked wheat feed.	Millet, hulled oats, rye, rice, Kafir corn, milo maize, wheat and cooked and baked wheat feed.	722
6.15	5.00	6.06	6.00	40.00	Twenty per cent. beef and fish scrap, gluten feed, cottonseed meal, oil cake meal, alfalfa meal, wheat bran, middlings, corn chop, grain screenings and oat chop.	As certified,	67
2.82	3.00	2.51	3.00	42.00	Peas, millet, cracked corn, buckwheat, wheat, Kafir corn, granulated bone and flaxseed.	Cracked corn, barley, wheat, buckwheat, Kafir corn, milo maize, peas, millet and flaxseed.	66
3.12	3.00	2.33	3.00	2.25	Peas, millet, cracked corn, wheat, barley, buckwheat, Kafir corn, granulated bone and flaxseed.	Cracked corn, wheat, barley, buckwheat, Kafir corn, milo maize, flaxseed, peas, millet and small amount whole weed seeds.	41
3.27	3.00	2.95	3.00	33.00	Recleaned ground screenings from wheat, sunflower seed, barley, corn, charcoal, rye, buckwheat, oats, Kafir corn and wheat.	Corn, oats, barley, wheat, rye, buckwheat, Kafir corn, milo maize, sunflower seed, charcoal, ground wheat screenings and trace whole weed seeds.	62

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Crude Protein.		
				Moisture.	Found.	Guaranteed.
726	Scratch Feed—No Grit, John W. Eshelman, Lancaster, Pa.	Lewistown, G. M. White,	726	Per ct. 12.36	Per ct. 10.00	Per ct. 10.00
42	Scratch Feed—No Grit or Shell John W. Eshelman, Lancaster, Pa.	Hanover, George Hull & Sons.	42	12.73	10.33	10.00
63	Scratch Feed—5 per cent. Grit, John W. Eshelman, Lancaster, Pa.	Average, Lancaster, John W. Eshelman.	63	13.15 12.88	10.36 9.13	10.00
270	Scratch Feed—5 per cent. Grit, John W. Eshelman, Lancaster, Pa.	Mt. Penn, Nein Brothers,	270	12.36	9.44	10.00
972	Scratch Feed—5 per cent. Grit, John W. Eshelman, Lancaster, Pa.	Carlisle, W. S. Stuart, ..	972	12.06	10.73	10.00
		Average, Patton, F. E. Farabaugh,		12.40	9.77	10.00
118	Dandy Dry Mash, F. E. Farabaugh, Patton, Pa.	Patton, F. E. Farabaugh,	118	10.31	21.00	20.00
255	Homer Pigeon Feed, I. S. Fry, Reading, Pa.	Reading, I. S. Fry,	255	11.81	16.38	13-14
254	Mash Feed, I. S. Fry, Reading, Pa.	Reading, I. S. Fry,	254	9.98	17.60	16-18
252	Mixed Hen Food, I. S. Fry, Reading, Pa.	Reading, I. S. Fry,	252	10.36	11.31	9-11
253	Pigeon Feed, I. S. Fry, Reading, Pa.	Reading, I. S. Fry,	253	12.89	12.86	12-12

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct.	Per ct.	Per ct.	Per ct.	Per ct.			
3.12	3.00	3.04	3.00	2.25	Recleaned grain screenings from wheat, sunflower seed, buckwheat, barley, cracked corn, rye, oats, Kaffir corn, and wheat.	Cracked corn, oats, wheat, rye, buckwheat, barley, Kaffir corn, milo maize, sunflower seed, wheat screenings and small amount whole weed seeds.	726
3.18	3.00	3.16	3.00	2.10	Cracked corn, buckwheat, Kaffir corn, recleaned grain screenings from wheat, sunflower seed, barley, wheat, rye and charcoal.	Cracked corn, oats, barley, wheat, rye, Kaffir corn, milo maize, buckwheat, sunflower seed, charcoal, wheat screenings and trace of whole weed seeds.	42
3.19	.....	3.05	.....	41.67	Recleaned grain screenings from wheat, sunflower seed, barley, corn, charcoal, rye, buckwheat, oats, Kaffir corn and wheat.	Corn, oats, wheat, rye, buckwheat, barley, Kaffir corn, milo maize, sunflower seed, charcoal, wheat screenings and trace whole weed seeds.	62
2.95	3.00	2.17	3.00	37.00			
2.72	3.00	2.84	3.00	2.20	Cracked corn, oats, buckwheat, Kaffir corn, recleaned grain screenings from wheat, sunflower seed, barley, wheat, rye, and charcoal.	Cracked corn, oats, wheat, rye, barley, buckwheat, Kaffir corn, milo maize, sunflower seeds, charcoal wheat screenings and small amount whole weed seeds.	271
3.00	2.00	2.80	3.00	2.25	Cracked corn, buckwheat, Kaffir corn, recleaned grain screenings from wheat, sunflower seed, barley, wheat, rye and charcoal.	Cracked corn, barley, wheat, rye, buckwheat, Kaffir corn, milo maize, charcoal, wheat screenings and small amount whole weed seeds...	972
2.89	.....	2.43	.....	42.67	Alfalfa meal, oil meal, wheat bran, wheat middlings, ground corn and oats, beef scraps and granulated bone.	As certified,	118
5.49	5.00	6.17	6.00	2.40			
4.57	3.5	4.69	4-6	2.90	Peas, Kaffir corn, buckwheat, wheat, millet, vetch and hemp seed.	Kaffir corn, milo maize, wheat, buckwheat, rye, peas, millet, vetch, hemp seed and small amount whole weed seeds.	255
5.95	5-6	6.00	6-7	2.50	Crushed oats, granulated corn, gluten feed, wheat middlings, bran, beef scrap, granulated bone, flaxseed meal, foenugreek, charcoal and 1 of 1 per cent. salt.	As certified,	254
3.37	2.5-3.5	3.22	4-5	2.40	Cracked corn, buckwheat, wheat, Kaffir corn, barley, sunflower seed and wheat screenings.	Cracked corn, wheat, buckwheat, barley, Kaffir corn, milo maize, sunflower seed, wheat screenings and small amount whole weed seeds.	253
4.29	2.4	3.68	4-6	2.60	Cracked corn, wheat, buckwheat, Kaffir corn, hemp seed, peas and wheat screenings.	Cracked corn, wheat, buckwheat, Kaffir corn, milo maize, hemp seed, peas, wheat screenings and small amount whole weed seeds.	253

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
740	Chick Food, Gamble, Gheen & Co., Bellefonte, Pa.	Antes Fort, Gheen, Spiegelmyer & Phleger.	740	Per ct. 11.88	Per ct. 10.75	.....
739	Excelsior Hen Food, Gamble, Gheen & Co., Bellefonte, Pa.	Antes Fort, Gheen, Spiegelmyer & Phleger.	739	11.60	10.94	.....
537	Standard A Brand Chick Feed, O. Gandy & Co., South Whitley, Ind.	Kittanning, William Gates, Est.	537	12.53	10.63	.....
124	Anchor Brand Scratch Feed, Globe Elevator Co., Buffalo, N. Y.	Patton, James Commons & Sons.	124	13.64	11.19	12-14
1183	Anchor Brand Scratch Feed, Globe Elevator Co., Buffalo, N. Y.	Brookville, Kilne's Sifter Mills.	1183	11.29	11.44	12-14
		Average, .....	.....	12.46	11.32	.....
353	Blue Ribbon Laying Mash, Globe Elevator Co., Buffalo, N. Y.	Phillipsburg, J. O. Reed,	353	9.33	20.21	20-22
457	Blue Ribbon Laying Mash, Globe Elevator Co., Buffalo, N. Y.	Mansfield, R. W. & M. F. Rose Co.	457	9.63	20.31	20-22
		Average, .....	.....	9.50	20.53	.....
733	Blue Ribbon Little Chick Feed, Globe Elevator Co., Buffalo, N. Y.	Lindsey, Lindsey Milling Co.	733	12.67	11.06	12-14
532	Ouckoo Scratch Feed, Howard H. Hanks Co., Chicago, Ill.	Kittanning, L. Pollock,...	532	11.87	9.29	9.50
776	Chick Feed, F. L. Heath, Corry, Pa.	Corry, F. L. Heath,	776	12.27	10.69	.....
775	Mash Feed, F. L. Heath, Corry, Pa.	Corry, F. L. Heath,	775	9.26	24.26	11-13
532	Chick Food, Francis Heck, Shamokin, Pa.	Shamokin, Francis Heck,	532	12.43	8.94	8-10 5

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct.	Per ct.	Per ct.	Per ct.	Per ct.			
3.29	.....	1.93	.....	.25	.....	Cracked corn, cracked wheat and cracked Kafir corn.	740
3.90	.....	3.32	.....	.25	Wheat, cracked corn, screenings, buckwheat and barley.	Cracked corn, oats, wheat, barley, Kafir corn, sunflower seed, screenings and small amount whole weed seeds.	789
3.06	.....	1.91	.....	2.15	Wheat, corn, Kafir corn and millet, no grit.	Corn, wheat, Kafir corn, milo maize and millet.	587
3.53	4-5	2.90	4-5	2.50	Combination of various seeds, with buckwheat, cracked corn, Kafir corn, wheat, barley, oats and cracked peas.	Cracked corn, oats, barley, wheat, rye, buckwheat, Kafir corn, milo maize, cracked peas and large amount whole weed seeds.	124
3.70	4-5	3.23	4-5	\$7.00	Combination of various grains, buckwheat, cracked corn, Kafir corn, wheat, barley, oats and cracked peas.	Cracked corn, oats, wheat, barley, buckwheat, Kafir corn, milo maize, cracked peas and trace of whole weed seeds.	1188
3.64	.....	3.06	.....	43.50			
5.85	3.00	9.74	9-10	2.20	Wheat bran, wheat middlings, wheat flour, ground oats, corn meal, corn gluten feed, pea meal, ground alfalfa, linseed oil meal, meat meal, fish scrap and ground bone.	As certified,	253
5.82	3.00	9.08	9-10	2.25	Wheat bran, wheat middlings, wheat flour, ground oats, corn meal, corn gluten meal, pea meal, ground alfalfa, linseed oil meal, meat meal, fish scrap and ground bone.	As certified,	457
5.84	.....	9.41	.....	2.23			
3.64	2-4	3.62	2-3	3.00	Cracked wheat, cracked corn, millet, Kafir corn and cracked green peas.	As certified,	758
3.48	2.50	2.77	5.00	2.06	Wheat, cracked corn, Kafir corn, barley, oats, sunflower seed and not over 4 per cent. grit, 4 per cent. shell and 1 per cent. charcoal.	Cracked corn, oats, wheat, barley, Kafir corn, milo maize, sunflower seed, grit, oyster shell and charcoal.	583
3.82	.....	3.00	.....	3.50	Cracked corn, pin head wheat, pin head oats, millet seed and rice.	Cracked corn, pin head oats, pin head wheat, millet, rice, flaxseed and trace whole weed seeds.	776
4.48	2-4	10.17	14-16	1.80	Bran, corn, gluten feed, wheat middlings, ground oats, beef scraps, oil meal, cottonseed meal and alfalfa meal.	As certified,	775
3.22	2-3	2.87	2-3	2.25	Cracked corn, cracked wheat, cracked Kafir corn, millet seed and charcoal.	As certified,	533

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
534	Hen Food, Francis Heck, Shamokin, Pa.	Shamokin, Francis Heck,	534	Per ct. 13.51	Per ct. 10.32	Per ct. 3-10.5
533	Poultry Mash, Francis Heck, Shamokin, Pa.	Shamokin, Francis Heck,	533	10.08	17.56	15.38
153	Hen-O-La Dry Mash, Hen-F-Ta Bone Co., Blairsville, Pa.	Somerset, John G. Emert,	153	7.67	12.44	12-13
626	Eureka Poultry Food, Hetrick, Wilson & Co., Indiana, Pa.	Indiana, Hetrick, Wilson & Co.	626	13.25	10.12	.....
337	Keystone Scratch Feed—No Grit, J. F. Hogsett & Son, Uniontown, Pa.	Uniontown, J. F. Hogsett & Son.	337	13.45	10.44	10.00
91	Hen Feed, Hoffer & Garman, Harrisburg, Pa.	Harrisburg, Hoffer & Garman.	91	14.12	10.21	2.00
488	Hornby's Scratching Grains, J. H. Hornby & Sons, New Brighton, Pa.	New Brighton, J. H. Hornby & Sons.	488	12.82	10.21	10.00
200	Imperial Chicken Feed, Huntingdon Milling Co., Huntingdon, Pa.	Huntingdon, Huntingdon Milling Co.	200	13.19	10.83	.....
891	International Poultry Feed—Scratch Size, International Sugar Feed Co., Minneapolis, Minn.	Butler, P. J. Oesterling & Son.	891	12.70	11.12	10.00
142	Scratch Feed, Johnstown Milling Co., Johnstown, Pa.	Johnstown, Johnstown Milling Co.	142	12.00	9.88	8.00
769	Will The Bill Chicken Mash, Kerr Hill Mill Co., Ltd., Titusville, Pa.	Titusville, Kerr Hill Mill Co., Ltd.	769	9.17	21.25	18.00
770	Mixed Grain Chicken Feed, Kerr Hill Mill Co., Ltd., Titusville, Pa.	Titusville, Kerr Hill Mill Co., Ltd.	770	11.79	11.00	.....
295	John-Hen Poultry Feed, Keystone Commercial Co., Pittsburgh, Pa.	McKeesport, Keystone Commercial Co.	295	13.35	10.21	10.00
297	John-Hen Poultry Feed with Grit and Ground Oyster Shell, Keystone Commercial Co., Pittsburgh, Pa.	McKeesport, Keystone Commercial Co.	297	11.24	9.21	10.00
Average,				12.22	9.80	.....

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct.	Per ct.	Per ct.	Per ct.	Per ct.			
2.05	2-3	2.80	2-3	2.15			
4.76	3.99	8.96	7.15	2.60	Wheat, cracked corn, barley, oats, buckwheat and charcoal.	As certified,	534
					Wheat bran, corn chop, oats chop, corn gluten feed, wheat middlings, alfalfa and Little Giant Stock Food Tonic.	Corn chop, oats chop, corn gluten feed, wheat middlings, wheat bran, alfalfa, meat, bone and blood meals, fennel, gentian, foenugreek, licorice root and charcoal.	533
3.43	2.3	5.53	3.4	2.50	Corn meal, gluten, middlings, bran, oil meal and benzoate, (sodium, lime, phosphorous and silica).	As certified,	158
2.60	.....	4.10	.....	2.00	Cracked corn, buckwheat and wheat.	As certified,	626
3.37	2.50	2.35	5.00	2.00	Corn, wheat, rye, barley, oats, Kafir corn, buckwheat and sunflower.	Corn, oats, wheat, rye, barley, buckwheat, Kafir corn, milo maize, millet, sunflower seed and trace of whole weed seeds.	337
3.07	3.00	2.93	2.75	2.00	Cracked corn, whole wheat, buckwheat, oats, Kafir corn, sunflower and wheat screenings.	Cracked corn, oats, wheat, buckwheat, Kafir corn, milo maize, wheat screenings and small amount of whole weed seeds.	91
3.13	2-5	2.67	5.00	1.95	Cracked corn, whole wheat, Kafir corn, barley, oats, buckwheat and sunflower seeds.	Cracked corn, oats, wheat, barley, buckwheat, Kafir corn, milo maize and sunflower seed.	488
3.13	.....	4.21	.....	2.50	Corn, wheat, oats, buckwheat and Kafir corn.	Corn, oats, wheat, buckwheat, Kafir corn and milo maize.	200
3.95	3.50	2.93	5.00	2.20	Corn, wheat, oats, barley, Kafir corn, or milo maize, buckwheat and sunflower seed.	Corn, oats, barley, wheat, buckwheat, Kafir corn, milo maize, sunflower seed and small amount whole weed seeds.	891
3.15	2.00	2.12	15.60	2.00	Cracked corn, Kafir corn, oats, wheat, sunflower seed, grit, oyster shell, buckwheat and rye.	Cracked corn, oats, wheat, rye, buckwheat, Kafir corn, milo maize, sunflower seed, grit and oyster shell.	142
4.00	6.00	8.26	8.00	2.10	Alfalfa meal, corn meal, bran, middlings, charcoal, ground oats, linseed meal, granulated meat and gluten.	As certified,	769
3.74	.....	2.93	.....	2.10	Corn, wheat, buckwheat, Kafir corn and sunflower seed.	As certified,	770
3.53	2.50	3.19	3.00	2.15	Wheat, cracked corn, buckwheat, barley, Kafir corn, oats, sunflower seed and charcoal.	Cracked corn, oats, wheat, barley, buckwheat, Kafir corn, sunflower seed, charcoal and trace of whole weed seeds.	236
3.27	2.50	2.94	8.00	2.10	Wheat, cracked corn, buckwheat, barley, Kafir corn, oats, sunflower seed and charcoal.	Cracked corn, oats, wheat, barley, buckwheat, Kafir corn, flaxseed, millet, sunflower seed, charcoal and small amount whole weed seeds.	207
3.10	.....	2.06	.....	2.12			

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
516	Poultry Food, Kift Milling Co., Sunbury, Pa.	Sunbury, Kift Milling Co.,	516	Per ct. 12.44	Per ct. 19.37	Per ct. 19.00
517	Star Mash Feed, Kift Milling Co., Sunbury, Pa.	Sunbury, Kift Milling Co.,	517	9.72	18.94	20.00
886	A. No. 1 Chick Food, H. J. Klingler & Co., Butler, Pa.	Butler, H. J. Klingler & Co.	886	12.53	19.37	.....
887	A. No. 1 Poultry Grains, H. J. Klingler & Co., Butler, Pa.	Butler, H. J. Klingler & Co.	887	12.22	19.37	.....
980	Blue Top Fine Chick Feed—No Grit, Charles A. Krause, Milling Co., Milwaukee, Wis.	Newport, F. M. Snyder & Co.	980	13.06	11.13	19.00
333	Blue Top Scratch Feed, Charles A. Krause Milling Co., Milwaukee, Wis.	New Salem, Mike Duvava,	333	12.00	10.25	19.00
888	Blue Top Scratch Feed with Grit, Shell and Charcoal, Charles A. Krause, Milling Co., Milwaukee, Wis.	Kittanning, L. Pollock, ..	888	12.22	10.06	19.00
1010	Equality Scratch Food, The Lake Shore Elevator Co., Cleveland, Ohio.	Washington, H. G. Miller,	1010	11.05	19.63	19.50
621	Equality Scratch Food, The Lake Shore Elevator Co., Cleveland, Ohio.	Oil City, New Model Milling Co.	621	12.33	11.13	19.50
		Average, .....	.....	12.44	19.33	.....
1012	Gro-Chick Developing Feed, The Lake Shore Elevator Co., Cleveland, Ohio.	Washington, H. G. Miller,	1012	11.57	19.00	11.50
961	Langdon's Poultry Mash, H. H. Langdon, Altoona, Pa.	Altoona, H. H. Langdon,	961	10.00	19.54	19.17

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 3.90	Per ct. 2.00	Per ct. 4.41	Per ct. 5.00	Per ct. 2.20	Kaffir corn, wheat, oats, corn and buckwheat.	Corn, oats, wheat, buckwheat, Kaffir corn and small amount whole seeds, pieces of straw, stems and chaff.	516
4.75	4.00	5.57	5.00	2.50	Meat scrap, fish scrap, charcoal, salt, corn chop, wheat middlings, oat chop, gluten feed, wheat bran and linseed meal.	Corn chop, oat chop, buckwheat, wheat middlings, wheat bran, corn gluten feed, linseed oil meal, meat scrap, fish scrap, charcoal and salt.	517
3.69	.....	2.48	.....	2.20	.....	Cracked corn, cracked buckwheat, cracked wheat, millet, ground Kaffir corn and milo maize and trace whole weed seeds.	886
3.39	.....	3.28	.....	2.10	.....	Cracked corn, oats, wheat, barley, buckwheat, Kaffir corn, milo maize, sunflower seed and small amount whole weed seeds.	887
3.33	2.50	2.22	5.00	2.15	Wheat, corn, Kaffir corn and millet.	Corn, wheat, Kaffir corn, milo maize, millet, flaxseed and small amount whole weed seeds.	980
3.30	2.50	2.25	5.00	2.10	Wheat, cracked corn, Kaffir corn, barley, oats, sunflower seed and not over 4 per cent. grit, 4 per cent. shell and 1 per cent. charcoal.	Cracked corn, oats, wheat, barley, Kaffir corn, milo maize, grit, oyster shell, charcoal and small amount whole weed seeds.	888
3.43	2.50	2.53	5.00	2.05	Wheat, cracked corn, Kaffir corn, barley, oats, sunflower seed and not over 4 per cent. grit, 4 per cent. shell and 1 per cent. charcoal.	Cracked corn, oats, wheat, barley, Kaffir corn, milo maize, sunflower seed, grit, oyster shell and charcoal.	583
3.31	3.40	3.06	2.65	2.25	Cracked corn, wheat, Kaffir corn, barley, buckwheat and sunflower seed.	Cracked corn, oats, wheat, barley, buckwheat, Kaffir corn, milo maize, sunflower seed, flaxseed and trace whole weed seeds.	1010
3.40	3.40	3.21	2.65	2.25	Cracked corn, wheat, Kaffir corn, barley, buckwheat and sunflower seed.	Cracked corn, barley, wheat, buckwheat, rye, Kaffir corn, milo maize, sunflower seed and small amount whole weed seeds.	621
3.36	.....	3.13	.....	2.25	.....	.....	.....
2.69	1.00	2.78	4.00	2.50	Cracked wheat, cracked corn, oat meal and millet seed.	Cracked corn, cracked wheat, barley, milo maize, millet, oat meal and small amount whole weed seeds.	1013
6.22	1-5	6.64	7-9	2.25	Wheat bran, wheat middlings, corn meal, alfalfa meal, oil meal, beef scraps, red dog, hominy and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	961

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sample at	Agent's number.	Moisture.	Crude Protein.		
					Found.	Guaranteed.	
960	Langdon's Scratch Grains, H. H. Langdon, Altoona, Pa.	Altoona, H. H. Langdon,	960	Per ct. 13.62	Per ct. 10.85	Per ct. 8-11	
119	Larro-Mash, The Larro-Milling Co., Detroit, Mich.	Patton, F. E. Farabaugh,	119	9.66	25.25	25.00	
165	Larro-Mash, The Larro-Milling Co., Detroit, Mich.	Weilsboro, The Farmers' Feed Store.	465	9.70	27.94	.....
		Average,		9.63	26.60	.....
49	L. & W. Mash Feed, Lehman & Wolgemuth, Elizabethtown, Pa.	Elizabethtown, Lehman & Wolgemuth.	49	9.83	21.06	19.00	
76	Blue Ribbon Poultry Feed, Levan & Sons, Columbia, Pa.	Lancaster, Levan & Sons,	76	10.90	10.75	6-8	
75	L. & S. Poultry Mash, Levan & Sons, Columbia, Pa.	Lancaster, Levan & Sons,	75	9.15	16.44	14-15	
759	Poultry Mash Food, W. H. Long, Howard, Pa.	Howard, W. H. Long,....	750	10.09	17.25	16-18	
798	Mash Feed, Mahoning Valley Milling Co., Punxsutawney, Pa.	Punxsutawney, Mahoning Valley Milling Co.	798	9.72	21.19	16-19	
964	Martin's Poultry Mash, Martin & Co., Altoona, Pa.	Altoona, Martin & Co.,...	964	9.84	24.63	24.00	
966	Martin's Scratch Feed, Martin & Co., Altoona, Pa.	Altoona, Martin & Co.,...	966	12.83	11.31	11.00	
1021	Best Mixed Grain for Chickens, C. P. Matthews & Sons, Inc., Scranton, Pa.	Wilkes-Barre, C. P. Matthews & Sons, Inc.	1021	10.56	9.88	8-9	

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 3.84	Per ct. 2-2	Per ct. 3.00	Per ct. 9.00	Per ct. 2.40	Cracked corn, wheat, buckwheat, barley, oats, Kaffir corn, sunflower seed, hemp and peas.	As certified,	960
3.64	2.00	7.77	10.00	2.40	Granulated dried beet pulp, granulated blood, granulated bone, oat middlings, standard wheat middlings, buckwheat feed, linseed oil meal standard wheat bran, corn gluten feed and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	119
3.00	.....	7.98	.....	2.25	Granulated dried beet pulp, blood meal, granulated bone, oat middlings, gluten feed, buckwheat feed, linseed oil meal, wheat bran, wheat middlings and $\frac{1}{2}$ per cent. salt.	As certified,	465
3.34	.....	7.84	.....	2.23			
5.70	4.00	7.61	9.60	1.90	Ground corn, oats, alfalfa, wheat bran, wheat middlings, gluten, high grade beef and salt.	Ground corn, oats, alfalfa, wheat middlings, wheat bran, corn gluten feed, beef and bone scrap and salt.	49
3.75	2-3	3.41	5-6	2.05	Buckwheat, wheat, Kaffir corn, barley, sunflower seed, oats, cracked corn, 5 per cent. grit and shell.	Cracked corn, oats, barley, wheat, buckwheat, Kaffir corn, milo maize, sunflower seed, grit and oyster shell.	76
4.89	3-4	3.00	7-8	2.25	Corn meal, oat meal, wheat bran, wheat middlings, alfalfa meal, old process linseed meal, beef scrap and 5 per cent. ground shell.	As certified,	75
5.17	2-4	5.55	6-8	2.00	Bran, corn chop, oats chop, gluten meal, standard middlings, low grade flour and beef scrap.	As certified,	750
5.84	2-4	9.16	15-17	2.00	Wheat bran, corn chop, cottonseed meal, ground oats, wheat middlings and alfalfa meal.	Corn chop, ground oats, wheat middlings, wheat bran, cottonseed meal, alfalfa meal, meat and bone scrap.	798
4.93	5.00	6.82	7.00	2.50	Wheat bran, wheat middlings, corn chop, gluten feed, ground oats, meat meal, and oil meal.	As certified,	964
3.23	2.90	2.83	3.69	2.50	Wheat, buckwheat, barley, oats, cracked corn, Kaffir corn, Canada peas and sunflower seed.	Cracked corn, oats, wheat, barley, buckwheat, Canada peas, sunflower seed and small amount whole weed seeds.	966
2.73	2-3	2.67	4-5	40.00	Kaffir corn, B. W. grains, clipped oats, wheat, cracked corn, sunflower seeds and grit.	Cracked corn, clipped oats, barley, wheat, buckwheat, Kaffir corn, sunflower seed, grit and small amount whole weed seeds.	1121

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sample at	Agent's number.	Crude Protein.		
				Moisture.	Found.	Guaranteed.
1016	Best Poultry Mash, C. P. Matthews & Sons, Inc., Scranton, Pa.	Wilkes-Barre, C. P. Matthews & Sons, Inc.	1016	Per ct. 9.39	Per ct. 13.37	Per ct. 17-20
1061	Best Poultry Mash, C. P. Matthews & Sons, Inc., Scranton, Pa.	Scranton, C. P. Matthews & Sons, Inc.	1061	8.69	13.38	17-20
		Average, .....	.....	9.39	13.60	.....
1020	Chicken Feed, C. P. Matthews & Sons, Inc., Scranton, Pa.	Wilkes-Barre, C. P. Matthews & Sons, Inc.	1020	11.39	10.69	8-10
1043	Mauser's Hen Food, Mauser Mill Co., Laurys Station, Pa.	Hazleton, Mauser Mill Co.	1043	12.11	9.62	9-10
296	Baby Chick Feed, R. S. McCague, Pittsburgh, Pa.	McKeesport, Keystone Commercial Co.	296	11.46	11.19	9-25
499	Chicken Mash, W. W. McCullough, West Bridgewater, Pa.	West Bridgewater, W. W. McCullough.	499	8.78	23.13	14-16
28	Ideal Scratch Feed, C. E. Miller, Hanover, Pa.	Hanover, C. E. Miller,	28	12.92	12.00	10-00
1032	Mixed Chicken Feed, Miner-Hillard Milling Co., Wilkes-Barre, Pa.	Wilkes-Barre, Miner-Hillard Milling Co.	1032	11.40	9.50	8-12
1060	Mixed Chicken Feed, Miner-Hillard Milling Co., Wilkes-Barre, Pa.	Scranton, Miner-Hillard Milling Co.	1060	11.25	9.75	8-12
		Average, .....	.....	11.33	9.63	.....
1026	Purity Poultry Mash, Miner-Hillard Milling Co., Wilkes-Barre, Pa.	Wilkes-Barre, Miner-Hillard Milling Co.	1026	9.08	13.63	15-17
1077	Poultry Mash, Miner-Hillard Milling Co., Scranton, Pa.	Scranton, Miner-Hillard Milling Co.	1077	9.00	12.51	15-17

FEEDING STUFFS COLLECTED IN 1915.—Continued

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.57	Per ct. 3-4	Per ct. 11.13	Per ct. 10-12	Per ct. 42.00	Gluten, white middlings, white bran, corn meal, linseed meal and alfalfa meal.	As certified,	1016
4.82	3-4	11.28	10-12	1.75	Gluten, white middlings, white bran, corn meal, linseed meal and alfalfa meal.	As certified,	1061
4.73	.....	11.20	.....	38.50			
3.11	2-3	2.43	3-4	39.00	Kafir corn, peas, sunflower seed, oats, wheat, corn, buckwheat, oyster shells, wheat screenings and grit.	Corn, oats, wheat, buckwheat, Kafir corn, sunflower seed, oyster shell, grit, wheat screenings and small amount whole weed seeds.	1020
2.84	2-3	2.40	3-4	2.00	Cracked corn, oats, wheat, Kafir corn, buckwheat and sunflower seed.	Cracked corn, oats, barley, wheat, buckwheat and Kafir corn.	1042
3.34	3.65	2.48	4.60	2.50	.....	Cracked corn, oats, barley, wheat, Kafir corn and large amount whole weed seeds.	296
5.24	3-5	8.97	10-12	2.00	Middlings, beef scraps, bran, hominy feed, corn gluten feed, alfalfa, oil meal, charcoal, corn, barley, wheat flour, puffed rice, puffed wheat, cottonseed meal, oat middlings, oat hulls, oat shorts and salt.	As certified,	493
2.34	2.50	2.50	5.00	2.00	Corn, wheat, Kafir corn, linseed oil cake, sunflower seed, buckwheat and barley.	Corn, oats, barley, wheat, buckwheat, Kafir corn, milo maize, linseed oil cake and sunflower seed.	23
2.92	2-3	2.37	4-5	2.00	Kafir corn, buckwheat, samp, wheat, cracked corn, grit, peas, sunflower seed and barley.	Cracked corn, barley, wheat, buckwheat, Kafir corn, milo maize, peas, sunflower seed, samp, or coarse hominy and grit.	1082
3.29	2-3	2.23	4-5	2.00	Kafir corn, buckwheat, samp, wheat cracked corn, grit, peas, sunflower seeds and barley.	Cracked corn, barley, wheat, buckwheat, oats, Kafir corn, milo maize, peas, samp (coarse hominy) and grit.	1080
3.11	...	2.30	.....	2.00			
4.52	5-7	10.00	8-10	2.20	Pea meal, alfalfa meal, wheat middlings, buckwheat middlings, wheat bran, ground oats and hominy feed.	As certified,	1026
4.49	5-7	6.83	8-10	2.00	Pea meal, alfalfa meal, wheat middlings, including mill run screenings, buckwheat middlings, wheat bran, including mill run screenings, ground oats, and hominy feed.	As certified,	1071

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sample at	Agent's number.	Moisture.	Crude Protein.	
					Pound.	Guaranteed.
1045	Poultry Mash, Miner-Hillard Milling Co., Wilkes-Barre, Pa.	Hazleton, John G. Seager's Sons.	1045	Per ct. 9.95	Per ct. 12.19	Per ct. 15-17
		Average,		9.32	12.77	.....
643	Special Scratch Feed, Miner-Hillard Milling Co., Wilkes-Barre, Pa.	St. Marys, Hall, Kaul & Hyde Co.	643	13.51	10.44	.....
1078	Special Scratch Feed, Miner-Hillard Milling Co., Scranton, Pa.	Scranton, Miner-Hillard Milling Co.	1078	12.49	10.13	8-12
		Average,		13.00	10.29	.....
1027	Superior Growing Feed, The Miner-Hillard Milling Co., Wilkes-Barre, Pa.	Wilkes-Barre, Miner-Hillard Milling Co.	1027	9.76	13.13	18-20
48	Ox-O Pure Dry Mash Poultry Feed, The New Oxford Pure Feed Co., New Oxford, Pa.	Hanover, High Street Produce Co.	48	8.90	26.06	25.00
841	Mash Feed, E. C. Noll, Lewisburg, Pa.	Lewisburg, E. C. Noll, ..	841	9.93	17.62	12-14
230	Justice Brand Scratch Feed, A. Nowak & Son, Buffalo, N. Y.	Myerstown, S. T. Yost, ..	230	13.19	10.63	.....
711	Justice Developing Feed, A. Nowak & Son, Buffalo, N. Y.	Yongertown, J. M. Yeager.	711	13.13	10.81	.....
668	Gritless Chick Feed, The Park & Pollard Co., Boston, Mass.	Williamsport, F. W. Dawson & Son.	668	12.43	13.50	11.00
355	Growing Feed, The Park & Pollard Co., Boston, Mass.	Phillipsburg, J. D. Reed, ..	355	12.03	15.15	10.00

FEEDING STUFFS COLLECTED IN 1915.- Continued

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4-42	Per ct. 5-7	Per ct. 6-23	Per ct. 8-10	Per ct. 2-90			
					Pea meal, alfalfa meal, wheat middlings, including mill run screenings, buckwheat middlings, wheat bran, including mill run screenings, ground oats, and hominy feed.	As certified,	1045
4.48	.....	7.68	.....	2.07			
3.06	.....	2.67	.....	2.50		Cracked corn, oats, barley, wheat, buckwheat, Kaffir corn, milo maize, split peas, flaxseed and trace of whole weed seeds.	648
3.10	2-4	2.13	2-4	2.10	Cracked corn, buckwheat grain, barley, Kaffir corn, wheat, sunp, cracked peas and sunflower seeds.	Cracked corn, oats, barley, wheat, buckwheat, Kaffir corn, milo maize, cracked peas and sunp (coarse hominy).	1078
3.08	.....	2.40	.....	2.30			
6.11	6-8	6.17	6-8	2.20	Wheat bran, wheat middlings, hominy feed and beef meal.	Wheat middlings, wheat bran, hominy feed, beef meal and small amount buckwheat.	1027
5.97	6.50	7.59	6.50	10.60	Beef, blood and bone, new process lined meal, steel cut oats, corn meal, wheat middlings, wheat bran, gluten, brewers grains and $\frac{1}{2}$ of 1 per cent. salt.	As certified,	48
5.91	2-8	6.33	15-17	28.50	Bean, middlings, corn chop, ground barley, wheat flour, hominy feed, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product (oat middlings, oat hulls, oat shorts), meat scraps, fish scraps, alfalfa meal and salt.	As certified,	841
3.79	.....	3.09	.....	2.25		Cracked corn, oats, barley, wheat, buckwheat, Kaffir corn, milo maize, sunflower seed, beans and peas.	230
2.62	.....	2.75	.....	3.00		Cracked corn, oats, rye, wheat, buckwheat, Kaffir corn, milo maize, split peas and small amount whole weed seeds.	711
3.03	3.50	2.93	5.00	3.00	Cracked: corn, wheat, Kaffir corn, milo, whole; millet seed, oats and shredded fish.	Cracked: corn, wheat, Kaffir corn, milo maize, whole; millet, oats, small amount weed seeds and shredded fish.	668
3.10	3.50	3.92	8.00	2.75	Ground: corn, wheat, barley, oats, meat, bone, alfalfa, Kaffir corn, wheat bran, wheat middlings, buckwheat, beet pulp, calcium carbonate and salt.	Ground: corn, wheat, barley, oats, meat, bone, alfalfa, Kaffir corn, wheat bran, wheat middlings, buckwheat, calcium carbonate and salt	355

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
671	Intermediate Chick Feed, The Park & Pollard Co., Boston, Mass.	Williamsport, F. W. Dawson & Son.	671	Per ct. 12.77	Per ct. 10.00	Per ct. 10.00
352	Lay or Bust Dry Mash, The Park & Pollard Co., Boston, Mass.	Philipsburg, J. O. Reed...	352	10.72	17.44	13.00
111	Lay or Bust Dry Mash, The Park & Pollard Co., Boston, Mass.	Johnstown, John Thomas & Sons.	111	8.94	19.21	13.00
		Average,		9.33	18.23	.....
687	Red Ribbon Chick Feed, The Park & Pollard Co., Boston, Mass.	Tyrone, Bayer-Gilliam Co.,	687	11.85	10.81	10.00
641	Red Ribbon Chick Feed, The Park & Pollard Co., Boston, Mass.	St. Marys, Hall, Kaul & Hyde Co.	641	12.37	11.19	10.00
		Average,		12.11	11.00	.....
357	Pioneer Scratch Feed, The Pioneer Cereal Co., Akron, Ohio.	Morrisdale, Morrisdale Feed & Grain Co.	357	10.29	11.25	10.94
166	Pioneer Scratch Feed, The Pioneer Cereal Co., Akron, Ohio.	Windber, L. B. Reeser & Co.	166	11.63	11.21	10.94
		Average,		11.26	11.23	.....
1112	Garland Scratch Feed—With Grit, Prairie State Milling Co., Chicago, Ill.	Monessen, J. A. Hagerman.	1112	10.96	10.21	10.00
989	Garland Scratch Feed—With Grit, Prairie State Milling Co., Chicago, Ill.	Braddock, Irwin Muir,	989	12.67	11.25	10.00
		Average,		11.81	10.25	.. ..
1172	Prairie State Scratch Feed—No Grit—Prairie State Milling Co., Chicago, Ill.	Tarentum, E. I. Toepfer,	1172	12.61	11.21	10.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 3.97	Per ct. 3.50	Per ct. 3.08	Per ct. 5.00	Per ct. 2.65	Cracked corn, wheat, buckwheat, oats, millet, Kafir corn and milo.	Cracked corn, oats, wheat, buckwheat, Kafir corn, milo maize, millet and small amount whole weed seeds.	671
3.39	3.50	7.50	12.00	2.20	Ground: wheat bran, wheat middlings, corn, wheat, oats, barley, Kafir corn, buckwheat, alfalfa, fish, meat, bone, beet pulp, calcium carbonate and salt.	As certified,	352
3.39	3.50	7.15	12.00	2.50	Ground: wheat bran, wheat middlings, corn, wheat, oats, barley, Kafir corn, buckwheat, alfalfa, fish, meat, bone, beet pulp, calcium carbonate and salt.	Ground: wheat bran, wheat middlings, corn, wheat, oats, barley, Kafir corn, milo maize, buckwheat, alfalfa, fish, meat, bone, beet pulp, calcium carbonate and small amount whole weed seeds.	111
3.34	.....	7.32	.....	2.35			
3.35	3.50	2.18	5.00	2.30	Cracked corn, wheat, oats, Kafir corn, milo and whole millet seed.	As certified,	637
3.02	3.50	2.32	5.00	3.00	Cracked corn, wheat, oats, Kafir corn, milo and whole millet seed.	Cracked corn, oats, wheat, Kafir corn, milo maize, millet and small amount whole weed seeds.	641
3.19	.....	2.25	.....	2.60			
3.13	2.60	2.25	3.50	2.10	Cracked corn, Kafir corn, oats, barley, wheat, buckwheat and sunflower seed.	Cracked corn, oats, barley, wheat, Kafir corn, milo maize, sunflower seed and small amount whole weed seeds.	357
3.12	2.60	3.64	3.50	1.95	Cracked corn, Kafir corn, oats, barley, wheat, buckwheat and sunflower seed.	Cracked corn, oats, barley, wheat, Kafir corn, milo maize and large amount whole weed seeds.	166
3.13	.....	2.94	.....	2.03			
3.23	2.50	2.39	5.00	2.15	Wheat, corn, Kafir corn, barley, sunflower seed, buckwheat and not over 4 per cent. grit, 4 per cent. shell and 1 per cent. charcoal.	As certified,	1112
3.22	2.50	2.23	5.00	1.95	Wheat, corn, Kafir corn, barley, sunflower seed, buckwheat and not over 4 per cent. grit, 4 per cent. shell and 1 per cent. charcoal.	Corn, oats, barley, wheat, buckwheat, Kafir corn, milo maize, sunflower seed, grit, oyster shell, charcoal and small amount whole weed seeds.	989
3.26	.....	2.33	.....	2.05			
3.40	1.50	2.44	5.00	33.00	Wheat, corn, Kafir corn, barley, sunflower seed, buckwheat and not over 1 per cent. charcoal.	Corn, barley, wheat, buckwheat, Kafir corn, milo maize, sunflower seed, charcoal and small amount whole weed seeds.	1172

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
999	Prairie State Scratch Feed—No Grit—Prairie State Milling Co., Chicago, Ill.	Washington, Washington Milling Co.	999	Per ct. 12.79	Per ct. 10.50	Per ct. 10.00
		Average, .....	.....	12.70	10.88	.....
932	Hen-O-La Mash Food, Preston & Jacquish, Troy, Pa.	Troy, Preston & Jacquish,	932	9.98	15.75	12.0
931	Scratch Grains, Preston & Jacquish, Troy, Pa.	Troy, Preston & Jacquish,	931	13.06	10.12	.....
314	Pritts' Dry Mash, J. E. Pritts, Scottsdale, Pa.	Scottsdale, J. E. Pritts', ..	314	10.91	30.25	22.5
1177	Pansy Scratch Feed, The Quaker Oats Co., Chicago, Ill.	Tarentum, J. A. Sharp,...	1177	12.09	10.44	10.00
1198	Pansy Scratch Feed—No Grit, The Quaker Oats Co., Chicago, Ill.	Indiana, St. Clair, Rinn & Co.	1198	11.84	10.44	10.00
1257	Pansy Scratch Grains—No Grit, The Quaker Oats Co., Chicago, Ill.	Hays, John Lachman & Co.	1257	13.08	9.81	10.00
602	Quaker Chick Feed—No Grit, The Quaker Oats Co., Chicago, Ill.	Franklin, Johnson & Co.,	602	13.86	10.75	10.00
704	Quaker Chick Feed—No Grit, The Quaker Oats Co., Chicago, Ill.	Mifflin, W. H. Manbeck & Co.	704	13.35	10.38	10.00
617	Quaker Chick Feed—No Grit, The Quaker Oats Co., Chicago, Ill.	Oil City, New Model Mill-Milling Co.	617	12.81	11.00	10.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct.	Per ct.	Per ct.	Per ct.	Per ct.			
5.62	2.50	7.28	5.00	2.00	Wheat, corn, Kafir corn, barley, sunflower seed, buckwheat and not over 1 per cent. charcoal.	Corn, oats, barley, wheat, buckwheat, Kafir corn, milo maize, sunflower seed, flaxseed and trace whole weed seeds.	999
3.51	.....	4.83	.....	39.00			
4.59	3.00	4.22	4.00	2.00	Corn meal, gluten feed, wheat middlings, wheat bran, copra cake meal, super fine hen-o-ta No. 4, No. 1 hen-o-ta, charcoal and beef scraps.	As certified,	983
3.69	.....	3.33	.....	2.00	Cracked corn, wheat, Kafir corn, buckwheat and charcoal.	Cracked corn, oats, wheat, buckwheat, Kafir corn, milo maize, charcoal and small amount whole weed seeds.	961
5.17	5-7	6.84	9.00	2.75	Beef scraps, alfalfa meal, cottonseed meal, corn, wheat, oats, charcoal, oil meal, wheat bran and wheat middlings.	Beef and bone scrap, alfalfa meal, cottonseed meal, corn, wheat, oats, charcoal, linseed oil meal, wheat bran and wheat middlings.	814
3.74	2.50	1.87	5.00	2.20	Wheat, whole Kafir corn, cracked Indian corn, whole buckwheat and sunflower seed.	Wheat, Kafir corn, milo maize, cracked Indian corn, buckwheat and sunflower seed.	1177
3.68	2.50	2.10	5.00	2.25	Whole wheat, whole Kafir corn, cracked Indian corn, whole buckwheat and sunflower seeds.	Cracked Indian corn, wheat, buckwheat, barley, Kafir corn, milo maize and sunflower seed.	1198
3.42	2.50	2.04	5.00	1.80	Wheat, whole Kafir corn, cracked Indian corn, whole buckwheat, sunflower seeds and whole barley.	As certified,	1257
3.48	2.50	3.19	5.00	2.40	Cracked wheat, cracked Kafir corn, cracked Indian corn, whole millet seed, oat meal, wild buckwheat with not to exceed $\frac{1}{2}$ of 1 per cent. miscellaneous wild seeds occurring in above seeds and grains and charcoal.	Cracked Indian corn, cracked wheat, cracked Kafir corn, whole millet, oat meal, charcoal and large amount of whole weed seeds.	692
3.47	2.50	2.66	5.00	2.50	Cracked wheat, cracked Kafir corn, cracked Indian corn, whole millet seed, oat meal, wild buckwheat with not to exceed $\frac{1}{2}$ of 1 per cent. miscellaneous wild seeds occurring in above seeds and grains and charcoal.	Cracked Indian corn, cracked wheat, cracked Kafir corn, whole millet, oat meal, charcoal and large amount of whole weed seeds.	704
3.42	2.50	3.28	5.00	2.10	Cracked wheat, cracked Kafir corn, cracked Indian corn, whole millet seed, oat meal, wild buckwheat with not to exceed $\frac{1}{2}$ of 1 per cent. miscellaneous wild seeds occurring in above seeds and grains and charcoal.	Cracked Indian corn, cracked wheat, cracked Kafir corn, whole millet, oat meal, charcoal and large amount of whole weed seeds.	617

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
696	Quaker Chick Feed—No Grit, The Quaker Oats Co., Chicago, Ill.	McVeytown, John T. Rodgers.	696	Per ct. 12.64	Per ct. 10.56	Per ct. 10.00
768	Quaker Chick Feed—No Grit, with not to exceed 1 per cent. Poultry Charcoal, The Quaker Oats Co., Chicago, Ill.	Titusville, Kerr Hill Mill Co., Ltd.	768	11.44	11.89	10.00
856	Quaker Chick Feed—No Grit, with not to exceed 1 per cent. Poultry Charcoal, The Quaker Oats Co., Chicago, Ill.	New Castle, New Castle Feed Co.	856	11.64	11.81	10.00
		Average,		12.70	11.66	.....
752	Quaker Scratching Grains—No Grit, The Quaker Oats Co., Chicago, Ill.	Bellefonte, G. R. Danenhower & Son, Inc.	752	12.37	10.94	10.00
190	Quaker Scratching Grains—No Grit, The Quaker Oats Co., Chicago, Ill.	Bedford, N. M. & O. R. Diehl.	190	12.32	11.81	10.00
603	Quaker Scratching Grains—No Grit, The Quaker Oats Co., Chicago, Ill.	Franklin, Johnson & Co.,	603	12.62	10.56	10.00
908	Quaker Scratching Grains—No Grit, The Quaker Oats Co., Chicago, Ill.	Mars, W. J. Kennedy & Son.	908	12.82	10.68	10.00
705	Quaker Scratching Grains—No Grit, The Quaker Oats Co., Chicago, Ill.	Mifflin, W. H. Maubeck & Co.	705	12.64	10.63	10.00
800	Quaker Scratching Grains—No Grit, The Quaker Oats Co., Chicago, Ill.	Reynoldsville Patton & Dangherly.	800	11.91	11.11	10.00
		Average, .....	.....	12.61	10.96	.....

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 3.64	Per ct. 2.50	Per ct. 2.67	Per ct. 4.00	Per ct. 3.00	Cracked wheat, cracked Kafir corn, cracked Indian corn, whole millet seed, oat meal, wild buckwheat with not to exceed $\frac{1}{2}$ of 1 per cent. miscellaneous wild seeds occurring in above seeds and grains and charcoal.	Cracked Indian corn, cracked wheat, cracked Kafir corn, whole millet, oat meal, charcoal and large amount of whole weed seeds.	696
3.71	2.50	3.08	5.00	3.00	Cracked wheat, cracked Kafir corn, cracked Indian corn, whole millet seed, oat meal, wild buckwheat with not to exceed $\frac{1}{2}$ of 1 per cent. miscellaneous wild seeds occurring in above seeds and grains and charcoal.	Cracked Indian corn, cracked wheat, cracked Kafir corn, whole millet, flaxseed, oat meal, charcoal and large amount whole weed seeds.	768
3.32	2.50	2.80	5.00	3.20	Cracked wheat, cracked Kafir corn, cracked Indian corn, whole millet seed, oat meal, wild buckwheat with not to exceed $\frac{1}{2}$ of 1 per cent. miscellaneous wild seeds occurring in above seeds and grains and charcoal.	Cracked Indian corn, cracked wheat, cracked Kafir corn, whole millet, flaxseed, oat meal, charcoal and large amount whole weed seeds.	866
3.54	.....	2.93	.....	2.70			
3.43	2.50	2.96	5.00	2.20	Whole: wheat, Kafir corn, barley, buckwheat, sunflower seeds and cracked Indian corn.	Cracked Indian corn, barley, wheat, buckwheat, Kafir corn, milo maize, sunflower seed and small amount whole weed seeds.	752
3.48	2.50	3.01	5.00	2.00	Whole: wheat, Kafir corn, barley, buckwheat, sunflower seeds and cracked Indian corn.	Cracked Indian corn, oats, barley, wheat, Kafir corn, milo maize, buckwheat, sunflower seed and small amount whole weed seeds.	190
3.60	2.50	2.87	5.00	2.25	Whole: wheat, Kafir corn, barley, buckwheat, sunflower seeds and cracked Indian corn.	Cracked Indian corn, barley, wheat, buckwheat, Kafir corn, milo maize, sunflower seed and small amount whole weed seeds.	603
3.22	2.50	2.84	5.00	2.00	Whole: wheat, Kafir corn, barley, buckwheat, sunflower seeds and cracked Indian corn.	Cracked Indian corn, barley, wheat, buckwheat, Kafir corn, milo maize, sunflower seed, flaxseed and trace of whole weed seeds.	903
3.25	2.50	1.06	5.00	2.35	Whole: wheat, Kafir corn, barley, buckwheat, sunflower seeds and cracked Indian corn.	Cracked Indian corn, barley, wheat, buckwheat, Kafir corn, milo maize, sunflower seed and small amount whole weed seeds.	705
3.52	2.50	2.51	5.00	2.05	Whole: wheat, Kafir corn, barley, buckwheat, sunflower seeds and cracked Indian corn.	Cracked Indian corn, barley, wheat, buckwheat, Kafir corn, milo maize, sunflower seed and trace of whole weed seeds.	800
3.42	.....	2.52	.....	2.14			

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
1003	Quaker Scratch Grains with not to exceed Oyster Shells or Marble Grit 6 per cent., The Quaker Oats Co., Chicago, Ill.	Houston, W. M. Templeton & Sons.	1003	Per ct. 13.35	Per ct. 10.13	Per ct. 10.00
1167	Quaker Scratch Grains with not to exceed Oyster Shells or Marble Grit 6 per cent., The Quaker Oats Co., Chicago, Ill.	Homestead, Vallowe Brothers.	1167	11.67	10.63	10.00
		Average, .....	.....	11.90	10.38	.....
902	Schumacher Little Chick Feed, The Quaker Oats Co., Chicago, Ill.	Mars, W. J. Kennedy & Son.	902	11.33	10.75	10.00
801	Schumacher Little Chick Feed, with Grit with not to exceed 6 per cent. Marble Grit, 1 per cent. Poultry Charcoal, The Quaker Oats Co., Chicago, Ill.	Reynoldsville, Patton & Daugherty.	801	11.55	10.45	10.00
		Average, .....	.....	11.33	10.60	.....
680	Schumacher Scratch Grains, The Quaker Oats Co., Chicago, Ill.	Tyrone, Bayer-Gilliam Co.	680	11.79	10.94	10.00
476	Purina Chick Feed, Ralston Purina Co., St. Louis, Mo.	Beaver Falls, John G. Allen.	476	13.44	10.30	11.00
570	Purina Chick Feed, Ralston Purina Co., St. Louis, Mo.	Irwin, T. F. Wilson,	570	12.31	11.33	11.00
		Average, .....	.....	12.87	11.13	.....
373	Purina Chicken Chowder Feed with Charcoal, Ralston Purina Co., St. Louis, Mo.	Bradford, L. A. Fischer & Co.	373	9.14	20.54	17.00
553	Purina Chicken Chowder Feed with not over 1 per cent. Charcoal, Ralston Purina Co., St. Louis, Mo.	Kittanning, William Gates, Est	553	9.74	21.97	17.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's Number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 2.94	Per ct. 2.50	Per ct. 2.48	Per ct. 5.00	Per ct. 2.06	Whole wheat, whole barley, cracked Indian corn, whole Kafir corn, whole buckwheat, sunflower seeds, oyster shell or marble grit 6 per cent.	Cracked Indian corn, oats, barley, wheat, buckwheat, Kafir corn, milo maize, sunflower seed, flaxseed, oyster shell, marble grit and small amount whole weed seeds.	1002
3.14	2.50	1.60	5.00	1.90	Whole wheat, whole barley, cracked Indian corn, whole Kafir corn, whole buckwheat, sunflower seeds, oyster shell or marble grit 6 per cent.	Cracked Indian corn, barley, wheat, buckwheat, Kafir corn, milo maize, sunflower seed, oyster shells, marble grit and small amount whole weed seeds.	1167
3.04	.....	2.51	.....	1.98			
3.22	2.50	2.37	5.00	2.25	Cracked wheat, cracked Kafir corn, cracked Indian corn, whole millet seed, oat meal, wild buckwheat, with not to exceed $\frac{1}{2}$ of 1 per cent. miscellaneous wild seeds occurring in above seeds and grains, charcoal and marble grit.	Cracked Indian corn, wheat, oatmeal, Kafir corn, milo maize, millet, flaxseed, charcoal, marble grit and large amount of whole weed seeds.	902
2.77	2.50	2.39	5.00	2.15	Cracked wheat, cracked Kafir corn, cracked Indian corn, whole millet seed, oat meal, wild buckwheat, with not to exceed $\frac{1}{2}$ of 1 per cent. miscellaneous wild seeds occurring in above seeds and grains, charcoal and marble grit.	Cracked Indian corn, wheat, millet, Kafir corn, oat meal, flaxseed, charcoal, marble grit and large amount of whole weed seeds.	301
3.53	.....	2.63	.....	2.20			
2.55	2.50	2.39	5.00	2.10	Whole wheat, whole Kafir corn, whole barley, cracked Indian corn, whole buckwheat and sunflower seed.	Cracked Indian corn, oats, barley, wheat, buckwheat, Kafir corn, milo maize, sunflower seed and small amount whole weed seeds.	690
3.54	3.00	2.87	4.00	2.75	Wheat, corn, millet Kafir corn, and milo maize.	As certified,	476
3.06	3.00	2.81	4.00	2.75	Wheat, corn, millet, Kafir corn, and milo maize.	Corn, wheat, Kafir corn, milo maize, millet and small amount of whole weed seeds.	570
3.30	.....	2.84	.....	2.75			
4.23	3.00	3.48	9.00	2.35	Wheat middlings, wheat bran, corn meal, salt, alfalfa meal, linseed meal, granulated meat and charcoal.	As certified,	373
4.24	3.00	9.22	9.00	2.50	Wheat middlings, wheat bran, corn meal, alfalfa meal, linseed meal, granulated meat and not over 1 per cent. salt.	As certified,	583

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.		
					Found.	Guaranteed.	
1215	Purina Chicken Chowder Feed with not over 1 per cent. Charcoal, Ralston Purina Co., St. Louis, Mo.	Blairsville, George J. New.	1215	Per ct. 9.64	Per ct. 19.94	Per ct. 17.00	
177	Purina Chicken Chowder Feed with Charcoal, Ralston Purina Co., St. Louis, Mo.	Johnstown, A. F. Stutzman & Co.	177	9.86	21.75	17.00	
		Average, .....	.....	9.59	20.83	.....
475	Purina Scratch Feed, Ralston Purina Co., St. Louis, Mo.	Beaver Falls, John G. Allen.	475	12.54	10.83	11.00	
688	Purina Scratch Feed, Ralston Purina Co., St. Louis, Mo.	Tyrone, Bayer-Gilliam Co.,	688	10.48	11.56	11.00	
375	Purina Scratch Feed, Ralston Purina Co., St. Louis, Mo.	Bradford, L. A. Fischer & Co.	375	12.04	11.19	11.00	
678	Purina Scratch Feed, Ralston Purina Co., St. Louis, Mo.	Williamsport, Gonl & King.	678	12.21	11.19	11.00	
389	Purina Scratch Feed, Ralston Purina Co., St. Louis, Mo.	Smethport, Herzog Milling Co.	389	12.97	10.94	11.00	
1214	Purina Scratch Feed, Ralston Purina Co., St. Louis, Mo.	Blairsville, George J. New.	1214	11.92	11.06	11.00	
406	Purina Scratch Feed, Ralston Purina Co., St. Louis, Mo.	Port Allegany, Port Allegany Milling Co.	406	11.50	11.38	11.00	
176	Purina Scratch Feed, Ralston Purina Co., St. Louis, Mo.	Johnstown, A. F. Stutzman & Co.	176	12.52	11.75	11.00	
1163	Purina Scratch Feed, Ralston Purina Co., St. Louis, Mo.	Derry, L. A. Wheeler, ..	1163	12.91	10.75	11.00	
569	Purina Scratch Feed, Ralston Purina Co., St. Louis, Mo.	Irwin, T. F. Wilson, ..	569	12.59	11.81	11.00	
		Average, .....	.....	12.16	11.25	.....
979	Regal Scratch Feed with Grift, Ralston Purina Co., St. Louis, Mo.	Newport, F. M. Snyder & Co.	979	10.60	11.38	10.00	
572	Succinea Chick Feed, Ralston Purina Co., St. Louis, Mo.	Pittsburgh, Dilworth Bros. Co.	572	12.66	11.19	10.00	

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 4.67	Per ct. 3.00	Per ct. 3.13	Per ct. 9.00	Per ct. 2.59	Wheat middlings, wheat bran, corn meal, alfalfa meal, linseed meal, granulated meat and not over 1 per cent. salt.	Corn meal, wheat middlings, wheat bran, alfalfa meal, linseed oil meal, meat, charcoal and salt.	1215
4.38	3.00	3.32	9.00	2.75	Wheat middlings, wheat bran, corn meal, salt, alfalfa meal, linseed meal, granulated meat and charcoal.	As certified,	177
4.57	.....	3.55	.....	2.53			
3.52	3.00	2.53	4.00	2.25	Wheat, corn, barley, Kaffir corn, milo maize and sunflower.	As certified,	475
3.16	3.00	3.11	4.00	2.35	Wheat, corn, barley, Kaffir or milo maize, sunflower and re-cleaned wheat screenings.	Corn, barley, wheat, Kaffir corn, milo maize, sunflower seed, wheat screenings and small amount of whole weed seeds.	688
3.33	3.00	2.79	4.00	2.25	Wheat, corn, barley, Kaffir corn, milo maize and sunflower.	Corn, barley, wheat, Kaffir corn, milo maize, sunflower seed, and trace of whole weed seeds.	375
3.38	3.00	2.57	4.00	2.25	Wheat, corn, barley, Kaffir corn, milo maize and sunflower.	Corn, barley, wheat, Kaffir corn, milo maize, sunflower seed and small amount of whole weed seeds.	678
3.49	3.00	2.39	4.00	2.20	Wheat, corn, barley, Kaffir corn, milo maize and sunflower.	Corn, barley, wheat, Kaffir corn, milo maize, sunflower seed, and small amount of whole weed seeds.	389
3.75	3.00	2.54	4.00	2.35	Wheat, corn, barley, Kaffir corn, milo maize and sunflower.	Corn, barley, wheat, Kaffir corn, milo maize, sunflower seed, and small amount of whole weed seeds.	1214
3.11	3.00	2.30	4.00	2.25	Wheat, corn, barley, Kaffir or milo maize, sunflower and re-cleaned wheat screenings.	Corn, barley, wheat, Kaffir corn, milo maize, sunflower seed, wheat screenings and small amount whole weed seeds.	406
3.71	3.00	3.12	4.00	2.25	Wheat, corn, barley, Kaffir, milo maize and sunflower.	As certified,	176
3.65	3.00	2.18	4.00	2.15	Wheat, corn, barley, Kaffir, milo maize and sunflower.	As certified,	1163
3.33	3.00	2.63	4.00	2.40	Wheat, corn, barley, Kaffir, milo maize and sunflower.	Corn, barley, wheat, Kaffir corn, milo maize, sunflower seed, flaxseed and small amount whole weed seeds.	569
3.45	.....	2.61	.....	3.27			
3.33	3.00	3.35	6.00	2.15	Wheat, corn, barley re-cleaned wheat screenings, sunflower and Kaffir or milo maize.	Corn, barley, wheat, Kaffir corn, flaxseed, sunflower seed, wheat screenings and large amount whole weed seeds.	979
3.15	3.00	2.34	6.00	2.45	Wheat, corn, millet, re-cleaned wheat screenings and Kaffir or milo maize.	Corn, wheat, Kaffir corn, milo maize, millet, wheat screenings and small amount whole weed seeds.	572

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
571	Success Scratch Feed, Ralston Purina Co., St. Louis, Mo.	Pittsburgh, Dilworth Bros. Co.	571	Per ct. 12.73	Per ct. 11.65	Per ct. 12.00
1061	Luzerne Capitol Poultry Mash, Robbins Milling Co., Wilkes-Barre, Pa.	Wilkes-Barre, Robbins, Milling Co.	1061	9.58	13.75	17-19
1060	Scratch Feeds, Robbins Milling Co., Wilkes-Barre, Pa.	Wilkes-Barre, Robbins Milling Co.	1060	11.51	11.44	.....
698	Hen-O-La Mash Food, John T. Rodgers, McVeytown, Pa.	McVeytown, John T. Rodgers.	698	8.06	12.33	12.00
984	Rummel's Poultry Mash, David Rummel, Mt. Union, Pa.	Mt. Union, David Rummel.	984	9.96	17.32	10-13
878	Red Hen Chick Starter, Saginaw Milling Co., Saginaw, Mich.	Pittsburgh, The I. W. Scott Co.	878	13.01	11.44	13-14
477	Red Hen Scratch Feed, Saginaw Milling Co., Saginaw, Mich.	Beaver Falls, John G. Allen.	477	12.85	10.94	11-13
1261	Red Hen Scratch Feed—with Grit, Saginaw Milling Co., Saginaw, Mich.	Hays, Charles F. Adamits,	1261	11.30	10.63	11-13
29	Oriole Brand A. A. A. High Grade Pigeon Feed, Wm. G. Scarlett & Co., Baltimore, Md.	Hanover, C. E. Miller, ..	29	11.77	17.50	14.50
286	Egg Mash Feed, Smith Brothers, Bradford, Pa.	Bradford, Smith Brothers,	286	9.34	16.60	15.00
724	Chick Food, Spanogle-Yeager Milling Co., Lewistown, Pa.	Lewistown, Spanogle-Yeager Milling Co.	724	12.06	10.31	.....
725	Hen-O-La Dry Mash, Spanogle-Yeager Milling Co., Lewistown, Pa.	Lewistown Spanogle-Yeager Milling Co.	725	7.79	11.54	10.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 5.15	Per ct. 5.00	Per ct. 2.65	Per ct. 6.00	Per ct. 2.30	Wheat, corn, barley, re-cleaned wheat screenings, sunflower, Kafir and milo maise.	Corn, barley, wheat, Kafir corn, milo maise, sunflower seed, wheat screenings, flaxseed and small amount whole weed seeds.	571
5.15	4-5	7.45	7-9	2.35	Bran, middlings, corn meal, beef scraps, alfalfa meal, blood meal, beef meal, oil meal and hominy feed.	As certified,	1061
3.34	.....	3.37	.....	2.30	Cracked corn, wheat, barley, buckwheat, Kafir corn and sunflower seed.	Cracked corn, barley, wheat, buckwheat, Kafir corn, sunflower seed and small amount whole weed seeds.	1000
4.30	3.00	4.30	4.00	2.00	Corn meal, gluten feed, wheat middlings, wheat bran, old process oil meal, superfine hen-e-ta No. 4, and No 1 hen-e-ta.	As certified,	606
5.10	2-4	7.36	.....	2.00	Wheat bran, meat scrap, Schunacher stock feed, (Ground corn ground barley, wheat flour, hominy feed, wheat middlings with ground screenings not exceeding mill run, ground puffed rice, ground puffed wheat, cottonseed meal, oat meal mill by-product, (oat middlings, oat hulls, oat shorts), and 1 of 1 per cent. salt, with corn chop added.	As certified,	964
2.65	2.5-3	1.90	3.5-4.5	2.05	Corn, wheat, peas, millet and Kafir corn.	As certified,	878
3.79	2.5-3	4.74	4-5	2.25	Wheat, corn, Kafir corn, buckwheat, sunflower seed and barley.	Corn, oats, barley wheat, buckwheat, Kafir corn and sunflower seed.	477
2.00	2.5-3	2.30	4-5	1.35	Wheat, corn, Kafir corn, buckwheat, sunflower seed, barley and grit.	As certified,	1261
3.23	2.30	3.74	3.00	3.00	Carefully selected and re-cleaned Kafir corn, buckwheat, milo maise, hemp, millet, vetch, peas, hulled oats and rice properly balanced.	As certified,	20
4.30	4.00	6.72	12.00	2.25	Corn meal, flour middlings, alfalfa meal, meat scraps, oil meal, gluten feed, hen-e-ta and charcoal.	Corn meal, oats, wheat flour middlings, linseed oil meal, corn gluten feed, alfalfa meal, meat scrap, hen-e-ta bone grit and charcoal.	306
3.25	.....	1.78	.....	2.10	Cracked: wheat, corn, Kafir corn and millet, etc.	Cracked: corn, wheat, millet, Kafir corn, and small amount whole weed seeds.	724
3.44	2.00	4.30	4.00	2.15	Corn meal, gluten, wheat middlings, wheat bran, oil meal and hen-e-ta (sodium, lime, phosphorous and silica.)	As certified,	725

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
983	Poultry Rations, Spanogle-Yeager Milling Co., Lewistown, Pa.	Mt. Union, David Rummel.	983	Per ct. 12.78	Per ct. 11.19	Per ct. 8-12
723	Poultry Rations, Spanogle-Yeager Milling Co., Lewistown, Pa.	Lewistown, Spanogle-Yeager Milling Co.	723	11.79	11.19	8-12
		Average,		12.28	11.19	.....
665	Spratts' Chicgrain, Spratts' Patent Ltd., Newark, N. J.	Williamsport, F. W. Dawson & Son.	665	10.80	13.75	14.00
662	Spratts' Patent Chick Meal (No. 5), Spratts' Patent Ltd., Newark, N. J.	Williamsport, F. W. Dawson & Son.	662	8.26	22.69	20.00
664	Spratts' Patent Egg Mash Food, Spratts' Patent Ltd., Newark, N. J.	Williamsport, F. W. Dawson & Son.	664	8.78	22.13	23.00
663	Spratt's Patent Growing Mash Food, Spratt's Patent Ltd., Newark, N. J.	Williamsport, F. W. Dawson & Son.	663	8.61	24.50	22.00
661	Spratt's Patent Poultry Food (No. 3), Spratt's Patent Ltd., Newark, N. J.	Williamsport, F. W. Dawson & Son.	661	8.20	20.13	20.00
257	Antwerp Pigeon Feed, Strunk & Moyer, Reading, Pa.	Reading, Strunk & Moyer,	257	12.22	16.69	14.81
256	Windy Scratch Feed, Strunk & Moyer, Reading, Pa.	Reading, Strunk & Moyer,	256	12.51	12.56	11.81
259	Knoxall Dry Mash, Strunk & Moyer, Reading, Pa.	Reading, Strunk & Moyer,	259	9.39	21.13	19.69
258	G. & M. Scratch Feed, Strunk & Moyer, Reading, Pa.	Reading, Strunk & Moyer,	258	12.52	10.63	10.63
116	Dry Mash—Egg Maker, Swope Brothers, Johnstown, Pa.	Johnstown, Swope Brothers.	116	9.83	18.27	19.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 2.97	Per ct. 4.4	Per ct. 2.39	Per ct. 4.4	Per ct. 2.50	Wheat, cracked corn, oats, barley, Kaffir corn, buckwheat, millet, sunflower seed, hen-o-ta bone grit and other seeds.	Cracked corn, oats, barley, wheat, buckwheat, Kaffir corn, milo maize, and small amount whole weed seeds.	953
3.50	4.4	3.02	4.4	2.00	Wheat, cracked corn, oats, barley, Kaffir corn, buckwheat, millet, sunflower seed and other seeds.	Cracked corn, oats, barley, wheat, buckwheat, millet, Kaffir corn, milo maize, and trace of whole weed seeds.	723
3.24	.....	2.70	.....	2.25			
3.24	3.00	2.80	5.00	3.75	Whole or ground wheat flour, buckwheat, wheat, popcorn, millet, rice, canary, meat, Kaffir corn, charcoal, green peas, bone, hemp and Mexican peas.	As certified,	665
1.89	2.50	1.03	2.00	5.75	Wheat flour and meat.	As certified,	662
6.90	4.50	8.01	8.00	2.75	Wheat bran, wheat, corn meal, alfalfa meal, ground meat, ground rice, ground Kaffir corn, ground buckwheat, ground bone, ground charcoal and ground peas.	Corn meal, alfalfa meal, millet, wheat, wheat bran and ground meat, rice, Kaffir corn, buckwheat, peas, bone, charcoal and grain screenings.	664
6.28	4.50	7.97	8.00	2.75	Wheat bran, wheat, corn meal, alfalfa meal, ground meat, ground rice, ground Kaffir corn, ground buckwheat, ground bone, ground charcoal and ground peas.	Corn meal, alfalfa meal, millet, wheat, wheat bran and ground meat, rice, Kaffir corn, buckwheat, peas, bone, charcoal and grain screenings.	663
1.63	3.50	0.80	2.00	5.75	Wheat flour and meat.	As certified,	661
4.11	4.43	4.30	4.43	3.20	Wheat, Kaffir corn, peas, buckwheat, hemp seed, millet and vetches.	Wheat, Kaffir corn, peas, buckwheat, hemp seed, millet, vetch and small amount whole weed seeds.	257
4.21	4.53	3.22	4.31	2.50	Wheat, cracked corn, Kaffir corn, buckwheat, barley, sunflower seed, meat and bone.	As certified,	256
5.33	5.45	8.41	8.94	2.25	Wheat bran, ground oats, corn chop, wheat middlings, gluten feed, alfalfa meal, beef scrap, salt and mustard.	As certified,	259
3.46	3.03	2.86	2.50	2.30	Wheat, cracked corn, Kaffir corn, buckwheat, barley and sunflower seed.	Cracked corn, barley, wheat, buckwheat, Kaffir corn, sunflower seed and small amount whole weed seeds.	258
4.65	1.50	6.38	8.00	48.00	Beef scraps, dried milk, ground oats, and barley (decorticated), home-made bran, home-made middlings, ground Kaffir corn, oil meal and alfalfa meal.	Ground and decorticated oats and barley, beef scrap, dried milk, corn, gluten feed, wheat bran, wheat middlings, ground Kaffir corn, linseed oil meal, alfalfa meal and trace of buckwheat hulls.	116

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sampled at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
112	Excelsior Chicken Feed, Swope Brothers, Johnstown, Pa.	Johnstown, Swope Brothers.	112	Per ct. 12.31	Per ct. 10.44	Per ct. 8.00
110	Thomas' Leader Egg Producer John Thomas & Sons, Johnstown, Pa.	Johnstown, John Thomas & Sons.	110	11.21	11.25	10.00
901	Camp's Chick Food, The Toledo Grain & Milling Co., Toledo, Ohio.	Mars, Mars Milling & Feed Co.	901	12.73	10.50	10.00
635	Camp's Red Ball Chick Food, The Toledo Grain & Milling Co., Toledo, Ohio.	DuBois, Timlin, Kelly & Co.	635	12.27	10.44	10.00
306	Camp's Scratch Feed, The Toledo Grain & Milling Co., Toledo, Ohio.	Mt. Pleasant, J. H. Brown & Son.	306	12.56	10.06	10.00
917	Scratch Grains, George Walter & Sons, Butler, Pa.	Butler, George Walter & Sons.	917	12.38	11.00	.....
246	Mashed Feed for Poultry, George W. Werts, Wernersville, Pa.	Reading, George W. Werts.	246	11.11	12.25	10.00
267	W. M. C. Chick Feed, Werts Milling Co., Reading, Pa.	Reading, Werts Milling Co.	267	10.92	11.23	8.00
266	W. M. C. Scratch Feed, Werts Milling Co., Reading, Pa.	Reading, Werts Milling Co.	266	12.70	11.19	8.00
ANIMAL BY-PRODUCTS.						
677	The Apco Poultry Meat, The Animal Products Co., Philadelphia, Pa.	Williamsport, Gohl & King	677	8.42	50.25	50-55
690	Berg's 3 Medal Poultry Meat, The Berg Co., Philadelphia, Pa.	Butler, H. J. Klingler & Co.	690	6.26	26.62	40-55
963	Berg's 3 Medal Poultry Meat, The Berg Co., Philadelphia, Pa.	Altoona, H. H. Langdon	96	6.45	25.34	40-55
969	Berg's 3 Medal Poultry Meat, The Berg Co., Philadelphia, Pa.	Carlisle, Frank E. Thompson.	969	9.22	27.05	40-55
406	Berg's 3 Medal Beef Scraps, The Berg Co., Philadelphia, Pa.	Average, .....	.....	7.34	26.19	.....
317	Garling's 60 per cent. Digester Tankage, Darling & Co., Chicago, Ill.	Port Allegany, Port Allegany Milling Co.	406	6.25	27.19	50-55
		Scottsdale, J. E. Pritts, ..	317	9.12	62.12	60.00

FEEDING STUFFS COLLECTED IN 1915.—Continued.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 2.08	Per ct. 2.50	Per ct. 3.80	Per ct. 6.00	Per ct. 40.00	Corn, Kafir corn, buckwheat, wheat, oats, barley, sunflower seed, grit and oyster shells.	Corn, oats, barley, wheat, buckwheat, Kafir corn, sunflower seed, grit, oyster shells and small amount whole weed seeds.	112
3.28	2.50	3.06	5.00	2.15	Cracked corn, wheat, barley, Kafir, charcoal, sunflower and buckwheat.	Cracked corn, barley, wheat, buckwheat, Kafir corn, milo maize, sunflower seed, charcoal and small amount whole weed seeds.	110
2.79	2.50	2.12	5.00	2.25	Cracked corn, Kafir corn, cracked winter wheat, old style cut oat meal, millet seed, sprinkling of flaxseed, oyster shells, charcoal and grit.	Cracked corn, cut oat meal, Kafir corn, milo maize, millet, flaxseed, cracked wheat, oyster shells, charcoal, grit and small amount whole weed seeds.	901
2.35	2.50	2.79	5.00	2.40	Cracked corn, Kafir corn, cracked winter wheat, old style cut oat meal, millet seed, sprinkling of flaxseed, oyster shells, charcoal and grit.	Cracked corn, cut oat meal, Kafir corn, millet, cracked wheat, flaxseed, oyster shells, charcoal, grit and large amount whole weed seeds.	635
2.19	2.50	2.35	5.00	2.25	Cracked corn, whole wheat, Kafir corn, barley, oats, buckwheat and sunflower seed.	Cracked corn, oats, barley, wheat, buckwheat, Kafir corn, milo maize and sunflower seed.	306
2.21	.....	2.65	.....	2.25	Pure whole and cracked grains.	Cracked corn, oats, barley, wheat, buckwheat, Kafir corn, and milo maize.	917
5.25	5.00	5.03	7.00	2.25	Compounded from corn, oats, middlings, bran and animal meal.	As certified,	246
2.57	2.50	2.50	6.00	2.25	Corn, wheat, Kafir corn, millet, bone and grit and steel cut oats.	Corn, wheat, Kafir corn, millet, steel cut oats, bone, grit and large amount whole weed seeds.	287
2.16	2.50	2.79	6.00	2.25	Cracked corn, wheat, barley, Kafir corn, buckwheat, sunflower seed, charcoal and grit.	Cracked corn, barley, wheat, buckwheat, Kafir corn, milo maize, sunflower seed, charcoal, grit and small amount whole weed seeds.	286
10.43	11-13	2.06	1-3	2.50	.....	Meat and bone scraps,	677
16.61	11-15	1.20	1-3	2.15	.....	Meat scrap,	890
14.95	11-15	1.94	1-3	2.50	.....	Meat and bone scrap, ..	963
15.90	11-15	1.99	1-3	2.50	.....	Meat and bone scrap, ..	969
15.83	.....	1.33	.....	2.23	.....	.....	.....
12.85	12-15	2.32	2-3	2.25	.....	Meat and bone scrap, ..	405
1.63	0.50	2.95	2.00	2.00	Meat products,	As certified,	317

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sample at	Agent's number.	Moisture.	Crude Protein.		
					Found.	Guaranteed.	
881	Darling's 60 per cent. Digester Tankage, Darling & Co., Chicago, Ill.	Pittsburgh, The I. W. Scott Co.	881	Per ct. 8.15	Per ct. 59.94	Per ct. 60.00	
	Average,			8.66	61.54	.....
318	Darling's High Protein Meat Scraps for Poultry, Darling & Co., Chicago, Ill.	Scottsdale, J. E. Pritts, ..	318	7.79	57.75	55.00	
1173	Darling's High Grade Meat Scraps for Poultry, Darling & Co., Chicago, Ill.	Tarentum, R. J. Toepfer,	1173	7.09	57.56	55.00	
	Average,			7.44	57.66	.....
1201	Darling's Meat Crisps—Poultry Food, Darling & Co., Chicago, Ill.	Indiana, St. Clair, Rinn & Co.	1201	7.85	80.63	75.00	
485	Dold's No. 2 Meat and Bone Scrap, Jacob Dold Packing Co., Buffalo, N. Y.	Elkland, Elkland Roller Mills.	485	7.72	49.19	45.00	
746	Dold Quality Digester Tankage, Jacob Dold Packing Co., Buffalo, N. Y.	Lock Haven, E. E. Wents	746	7.63	64.56	60.00	
745	Meat and Bone Scrap, Jacob Dold Packing Co., Buffalo, N. Y.	Lock Haven, E. E. Wents,	745	7.15	53.63	50.00	
36	Ground Beef Scraps for Poultry, John W. Eshelman, Lancaster, Pa.	Hanover, George Hull & Sons.	36	9.73	50.75	50-55	
977	Ground Beef Scraps for Poultry, John W. Eshelman, Lancaster, Pa.	Carlisle, W. S. Stuart, ..	977	7.15	54.44	50-55	
	Average,			8.46	52.60	.....
518	Red Star Brand Fish Scrap, International Glue Co., Boston, Mass.	Sunbury, Kift Milling Co.,	518	10.72	53.94	45-54	
799	Swack's High Grade Poultry Food Dried Meat, John T. Swack, DuBois, Pa.	Punxsutawney, Mahoning Valley Milling Co.	799	9.25	48.28	.....
978	Swift's Digester Tankage, Swift & Co. Newark, N. J.	Carlisle, W. S. Stuart, ..	978	9.79	61.33	60.00	
1136	Woolridge's Beef Scraps for Poultry, The Robert A. Woolridge Co., Baltimore, Md.	E. Downingtown, J. W. Maxwell.	1136	9.50	62.44	55.00	
CONDIMENTAL STOCK AND POULTRY FOODS.							
508	B. & G.'s Baby Chick Feed, Blank & Gottshall, Sunbury, Pa.	Sunbury, Blank & Gottshall.	508	8.75	12.31	10.00	
627	Federal Poultry Tonic, Federal Stock Food Co., Mifflinburg, Pa.	Mifflinburg Federal Stock Food Co	627	7.15	9.25	.....

FEEDING STUFFS COLLECTED IN 1915.—Continued.

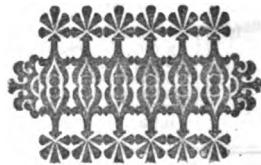
Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 7.27	Per ct. 0.50	Per ct. 2.06	Per ct. 3.00	Per ct. 48.00	.....	Digester tankage,	851
4.45	.....	2.51	.....	50.00	.....	.....	.....
7.20	0.50	2.72	3.00	3.00	Meat products,	As certified,	318
2.89	0.50	3.14	3.00	3.25	Meat products,	Meat and bone scrap, ..	1173
5.55	.....	3.43	.....	8.13	.....	.....	.....
7.86	0.50-1	0.57	3.00	.25	Sweet meat trimmings, cooked, pressed and dried.	As certified,	1201
9.91	6-8	3.01	5.00	3.00	.....	Meat and bone scrap, ..	435
11.61	8.00	1.42	5.00	3.00	.....	Digester tankage,	746
8.08	8.00	1.47	5.00	3.50	.....	Meat and bone scrap, ..	745
9.45	10-12	1.57	1-2	2.75	Ground beef cracklings.	Ground beef and bone scrap.	36
14.36	10-12	0.85	1-2	3.75	Ground beef cracklings.	Ground beef and bone scrap.	977
11.91	.....	1.21	.....	3.25	.....	.....	.....
1.53	2.00	0.54	1.00	3.25	.....	Fish scrap,	518
11.77	.....	1.51	.....	4.00	.....	Meat and bone scrap, ..	799
9.28	8.00	1.77	3.00	2.75	.....	Digester tankage,	978
10.04	10.00	2.50	3.00	3.00	.....	Beef and bone scrap, ..	1136
3.23	3.00	2.72	4.00	1.20	Wheat bran, wheat middlings, shredded wheat, corn meal, hulled oats, ground hen-e-ta, meat meal, bone, flour, ground blood, charcoal, German fennel seed, French gentian root, foenugreek seed and Spanish licorice root.	As certified,	508
3.99	.....	20.60	.....	3.50	Mustard bran 7 per cent., cocoa shells 25 per cent., buckwheat hulls 25 per cent., red pepper, sulphate of iron, black pepper, oyster shells for grit, 14 per cent., Venetian red 12 per cent., anise seed, foenugreek and sassafras bark of the root.	As certified,	527

TABLE V.—ANALYSES OF SAMPLES OF

Chemist's number.	Name of Feeding Stuff and Name and Address of Manufacturer or Importer.	Sample at	Agent's number.	Moisture.	Crude Protein.	
					Found.	Guaranteed.
528	Federal Stock Tonic, Federal Stock Food Co., Millinburg, Pa.	Millinburg, Federal Stock Food Co.	528	Per ct. 14.68	Per ct. 19.61	Per ct.
672	Pratt's Baby Chick Food, Pratt Food Co., Philadelphia, Pa.	Williamsport, F. W. Dawson & Son.	672	19.39	12.83	12.00
199	Security Calf Food Compound, Security Remedy Co., Minneapolis, Minn.	Huntingdon, Huntingdon Milling Co.	199	9.37	16.06	9.30

FEEDING STUFFS COLLECTED IN 1915.—Concluded.

Crude Fat.		Crude Fiber.		Price per ton or cwt.	Certified Composition.	Identified by Microscopical Examination.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.				
Per ct. 3.98	Per ct.	Per ct. 13.57	Per ct.	Per ct. 3.50	Carboligin (Charcoal), aniseed, foenugreek, gentian, capsicum, (red pepper,) sublimate of sulphur $\frac{1}{2}$ of 1 per cent., sublimate of magnesia (epsom salts), sulphate of iron (copperas) cocoa shells 30 per cent., sassafras bark of the root, mustard bran and buckwheat hulls $\frac{3}{4}$ per cent.	As certified,	528
4.98	4.50	2.85	3.00	10.00	Hulled oats, corn meal, wheat middlings, epsom salts, bone meal, cooked wheat, pepper, gentian, millet, ginger, rape caraway and shell meal.	As certified,	672
4.39	4.50	4.23	6.00	16.00	St. John's bread, ginger, foenugreek, flour, anise, sugar, oxide iron, sulphate iron, salt, middlings, starch and powdered milk.	As certified,	190



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DEPARTMENT OF AGRICULTURE

BULLETIN No. 281

LIST OF
County and Local Agricultural
Societies

With Names and Addresses of Presidents and Secretaries and Dates
for Holding Fall Exhibitions for 1916.



CHARLES E. PATTON, Secretary of Agriculture L. H. WIBLE, Statistician

Published by Direction of the Secretary

HARRISBURG, PA.:
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PREFACE.

Harrisburg, Pa., May 31, 1916.

In order to encourage correspondence and co-operation among the agricultural societies and fair associations of the State, this Department again gives, in this bulletin, as full a list as it has been able to secure of such societies and associations within the Commonwealth, together with the names and addresses of their officers, and the dates arranged for exhibitions during the coming fall.

It will be noticed that some of the societies given in the list do not hold exhibitions. They, however, appear in the bulletin in order that the list of associations organized for the advancement of agricultural education may be as complete as possible, and to give other associations opportunity to correspond with them. The societies, whether holding fairs or not, are fruitful sources of good to the agriculture of the Commonwealth, and are assured of the sympathy and, as far as possible, the co-operation of this Department.

CHARLES E. PATTON,
Secretary of Agriculture.



LETTER OF TRANSMITTAL

Harrisburg, Pa., May 31, 1916.

Hon. Charles E. Patton, Secretary of Agriculture:

Dear Sir: This bulletin contains list of Local and County Agricultural and Horticultural Societies, with dates of Fairs, also Grange Exhibits, to be held in Pennsylvania during the year 1916, as reported by secretaries representing the different organizations. The dates of certain fairs have been omitted on account of secretaries failing to report same.

The attendance for 1915, 2,004,326 as compared with the previous year, 1,830,722, shows an increase of 173,604; membership, 17,000; amount received from State Fund, \$57,355.18; amount paid in premiums, 1915, \$140,824.39; amount offered in premiums, 1916, \$179,671.42, an increase of \$18,045.00. It will be observed in this connection that only seventy-six societies reported to this Department last year while eighty-five reported this year.

Very respectfully,

L. H. WIBLE,
Statistician.

List of County and Local Agricultural Societies, with Names and Addresses of Presidents and Secretaries and Dates for Holding Fall Exhibitions for 1916, Etc.

County.	Name of Society.	Name and Address of President	Name and Address of Secretary.
Adams.	State Horticultural Association of Pennsylvania.	Dr. I. H. Moyer, Willow Street.	F. N. Fagan, State College.
Adams.	Fruit Growers' Association of Adams County.	C. Arthur Grist, Guernsey.	Edwin C. Tyson, Florida.
Allegheny.	Biglerville County Agricultural, Hort. and Poultry Association.	E. H. Plank, Gettysburg.	O. C. Rice, Biglerville.
Armstrong.	Kiskiminetas Valley Agricultural Association.	C. B. Burns, Imperial, R. D. No. 1.	C. B. Burns, Imperial, R. D. No. 1.
Armstrong.	Dayton Agricultural and Driving Association.	George W. Steele, Apollo.	J. E. Gallagher, Apollo.
Beaver.	Beaver County Agricultural and Mechanical Association.	A. K. Good, Dayton.	C. C. Cochran, Dayton, R. D. No. 1.
Bedford.	Bedford County Agricultural Association.	Dr. J. S. Louthan, Beaver Falls.	M. J. Patterson, Beaver.
Bedford.	Grangers Picnic Association.	Dr. S. F. Stalter, Bedford.	J. Roy Cessna, Bedford.
Berks.	Agricultural and Horticultural Association of Berks County.	J. C. McClure, Osterburg.	George W. Oster, Osterburg.
Berks.	Kutztown Fair Association.	W. Harry Orr, 309 So. 5th St., Reading.	D. J. McDermott, 30 North Sixth St., Reading.
Blair.	Blair County Grange Fair Association.	Charles D. Herman, Kutztown.	G. C. Bordner, Kutztown.
Bradford.	Bradford County Agricultural Society.	Dr. W. Frank Beck, Altoona.	H. S. Wertz, Duncansville.
Bucks.	Troy Agricultural Society.	G. Kerrick, Treadway, R. D.	Thomas W. Piolet, Wysox.
Bucks.	Farmers' Picnic and Exhibition Society.	W. Elmer Samsol, Benjamin.	W. F. Montgomerie, Troy.
Butler.	Chicora Driving Park Association, Ltd.	Harry S. Johnson, Quakertown, R. D. 1.	L. V. B. Bigler, Pottsville.
Butler.	Butler Driving Park and Fair Association.	Dr. C. L. DeVolf, Chicora.	Jacob M. Lindis, Quakertown, R. D. 4.
Butler.	North Washington Agricultural Association.	G. A. Schaffner, Butler.	W. B. Purvis, Butler.
Cambria.	Cambria County Agricultural Association, Limited.	J. F. Harper, North Washington.	P. B. Meals, North Washington.
Carbon.	Patrons of Husbandry.	J. Ed. Stevens, Carrolltown.	J. V. Maucher, M. D., Carrolltown.
Centre.	Chester County Agricultural Association.	O. F. Acker, Lehigh.	J. Albert Durling, Lehigh.
Clarion.	Licking Valley Agricultural Association.	Leonard Rhone, Centre Hall.	Leonard Rhone, Centre Hall.
Clarion.	Clearfield County Agricultural Society.	David M. Golder, West Chester.	Fred DuRose Reid, West Chester.
Clearfield.	DuBois Driving Association.	Foster M. Mohney, Clarion.	B. H. Frampton, Clarion.
Columbia.	Columbiana County Agricultural, Hort. and Mechanical Asso.	W. J. Hartman, Sligo, R. D.	Harry C. Craig, Clarionville.
Crawford.	Conneaut Lake Agricultural Association.	Curtis Read, Clearfield.	W. E. Davis, Clearfield.
Cumberland.	Agricultural Society of Cumberland County.	B. E. McCreight, DuBois.	P. E. Griesemer, DuBois.
Cumberland.	Great Grangers' Picnic Exhibition.	H. O. Holcomb, Exposition Park.	Harry B. Correll, Bloomsburg.
Dauphin.	Middletown Fair Association.	J. E. Foster, Carlisle.	J. G. Klingensmith, Exposition Park.
Dauphin.	Gratz Agricultural and Horticultural Society.	A. E. Thompson, Jr., Mechanicsburg.	Allen D. Cooper, Titusville.
Delaware.	Delaware County Agricultural Society.	R. H. Thomas, 30 Mechanicsburg.	W. H. McCrea, Newville.
Elk.	Elk County Farmers' Agriculture Association.	A. J. Smith, Gratz.	W. K. Thomas, 30 Mechanicsburg.
Erie.	Corry Fair and Driving Park Association.	Thomas H. Wittkorn, Media.	Guy R. Klinger, Middletown.
Erie.	The Wattsburg Agricultural Society.	H. J. Gregory, St. Marys.	J. M. Rockner, Wallingford.
Erie.		D. Warren DeRosay, 121 Maple Ave., Corry.	E. J. Gotsinger, St. Marys.
Erie.		A. H. Austin, Wattsburg.	W. W. Morgaridge, 25 Park Place St. Corry.
Erie.			J. F. Dearing, Wattsburg.

Fulton.	Big Cove Agricultural Society of Fulton County.	William Brewer, McConnellsburg.	W. C. Patterson, McConnellsburg.
Greene.	Greene County Agricultural and Manufacturing Society.	N. M. Riddle, Carmichaels.	C. J. Lincoln, Carmichaels.
Indiana.	Indiana County Agricultural Society.	M. F. Jamison, Indiana.	David Blair, Indiana.
Jefferson.	Jefferson County Agricultural Association.	N. L. Strong, Brookville.	Sgt. Truman, Brookville.
Jefferson.	Punkstutawney Fair Association.	Dr. G. W. Means, Punkstutawney.	Joseph M. Williams, Punkstutawney.
Junata.	Junata County Agricultural Society.	Stuart A. Wallace, Port Royal.	James N. Groninger, Port Royal.
Lackawanna.	Lackawanna County Fair and Grange Poultry Association.	N. A. Wallace, Clarks Summit.	F. L. Thompson, Clarks Summit.
Lackawanna.	Lackawanna County Horticultural Association.	A. B. Kliner, Moscow, R. D.	J. E. Williams, care 3d Nat. Bank, Scranton.
Lancaster.	Lancaster County Agricultural Fair Association.	P. T. Watt, E. King St., Lancaster.	J. F. Seldomridge, 34½ N. Queen St. Lancaster.
Lawrence.	Lawrence County Agricultural Association.	K. C. Hayes, Pulaski.	J. F. Buchanan, Pulaski.
Lebanon.	Lebanon County Agricultural and Horticultural Association.	Edgar A. Weimer, Lebanon.	S. P. Holman, M. D. Lebanon.
Lebanon.	Lebanon Valley Fair Association.	W. A. Rollman, Lebanon.	T. A. Hollman, Lebanon.
Lehigh.	Lehigh County Agricultural Society.	Dr. Victor H. Wileand, 411 N. 7th St. Allentown.	Harry B. Schall, Allentown.
Luzerne.	Wilkes-Barre Poultry and Agricultural Association, Inc.	J. M. Wilcox, 114 Carey Ave., Wilkes-Barre.	F. N. Roll, 550 Carey Ave., Wilkes-Barre.
Luzerne.	Dallas Union Agricultural Association.	William R. Robinson, Wilkes-Barre.	F. E. Hoack, Dallas.
Lycum.	Lycum County Fair Association.	Theo. A. Roak, Hughesville.	Edward E. Frantz, Hughesville.
McKean.	McKean County Fair Association.	E. A. Studholme, Smethport.	Henry J. Rice, Smethport.
Mercer.	Mercer County Agricultural Society.	Joseph A. Bond, Stoneboro.	George H. Fowler, Stoneboro.
Mercer.	Mercer Central Agricultural Society.	John P. Orr, Mercer.	Robert M. Gilkey, Mercer.
Mifflin.	Mifflin County Agricultural and Agricultural Association.	J. A. Esh, Milroy.	H. H. Laub, Jr., Lewistown.
Monroe.	Monroe County Agricultural Society.	Jesse Ransberry, East Stroudsburg.	Henry S. Smoyer, Stroudsburg.
Montgomery.	Montgomery County Fair Association.	David Hoag, 37 High St., Pottstown.	C. M. Shaner, Pottstown, R. D. No. 1.
Northampton.	Northampton County Agricultural Society.	William K. Shimer, Nazareth.	J. R. Reinheimer, Nazareth.
Northumberland.	Northampton County Agricultural Asso.	James I. Higbee, Watsonstown.	William G. Murdoch, Milton.
Perry.	Milton Fair and Northumberland County Agricultural Asso.	T. H. Buttrick, Newport.	J. C. F. Stephens, Newport.
Philadelphia.	Perry County Agricultural Society.	C. Hartman Kuhn, Franklin Nat. Bank Bldg. Phila.	David Rust, Horticultural Hall, Phila.
Philadelphia.	Pennsylvania Horticultural Society.	Alvah R. Hoffman, Somerset, R. D.	John S. Miller, Somerset.
Somerset.	Somerset County Agricultural Society.	S. K. Kliner, Montrose.	O. N. Molyneux, Somerset.
Sullivan.	Sullivan County Agricultural Society.	F. A. Dams, Montrose.	W. G. Constock, Montrose.
Susquehanna.	Susquehanna County Agricultural Society.	E. F. MacConnell, Harford.	O. F. Maxnard, Harford.
Susquehanna.	Harford Agricultural Society.	S. C. Birchard, Birchardville.	G. L. Pickett, Lawton.
Susquehanna.	Lawton Agricultural Society.	G. H. Runsey, Westfield.	J. W. Smith, Westfield.
Tioga.	Susquehanna Valley Agricultural Society.	John P. Pitts, Elmira, N. Y.	F. H. Marvin, Mansfield.
Tioga.	Smyth Park Fair Association.	William P. Mauser, Lewisburg, R. D.	C. Dale Wolfe, Mansfield.
Union.	Union County Fair Association.	Caleb D. Sutton, Franklin.	John L. Hanna, Mansfield.
Union.	Union Farmers' and Fruit Growers' Association.	Clayde C. Smith, Warren.	Hugh V. Hazeltine, Warren.
Warren.	Warren County Agricultural Association.	D. B. Hitchcock, Russell.	R. J. Weld, Sugar Grove.
Washington.	Washington Fair Association.	H. S. Grayson, Washington.	James P. Eagleson, Washington.
Washington.	Washington Fair Farmers' and Breeders' Association.	Andrew Allen, Millsboro.	B. Frank Emery, Millsboro.
Wayne.	Sandy Plains Fair Association.	E. P. Jones, Ardel.	E. W. Gammell, Honesdale.
Wayne.	Westmoreland Fair Association.	J. W. Ruth, Scottsdale.	W. F. Holtzer, Greensburg, R. D. No. 4.
Westmoreland.	Westmoreland Fair Association.	S. S. Brunzes, Tunkhannock.	O. D. Stark, Tunkhannock, R. D. No. 4.
Wyoming.	Wyoming County Fair Association.	Charles S. Shirk, Hanover.	S. A. Geiselman, Hanover.
York.	Hanover Agricultural Society.	John H. Wozan, York.	Henry C. Heckert, York.
York.	New Freedom County Agricultural Society.	W. E. Smith, New Park.	M. F. Ziegler, New Freedom.
York.	New Freedom Farmers' Improvement Association.	H. L. Perry, Dallastown.	Thos. W. Bates, Fawn Grove.
York.	Pen-Mar County Agricultural Association.	W. J. Perry, Dallastown.	J. Miller, Red Lion.
York.	Red Lion Fair Association.	W. J. Gimmill, Stewartstown.	I. H. Ebaugh, Stewartstown.
York.	Stewartstown Agricultural Association.		

**List of County and Local Agricultural Societies, with Names and Addresses of Presidents and Secretaries and
Dates for Holding Fall Exhibitions for 1916, Etc.—Continued.**

County	Name of Society	Attendance, 1915	Race track	Membership	Amount received from State		Premiums		Date
							Paid, 1916	(Offered, 1916)	
Adams,	Fruit Growers' Association of Adams Co.,	6,500	.....	224	\$107 50	.....	\$235 60	.....	Dec. 13-15
Adams,	Biglerville Agricultural, Hort. and Poultry Association .....	.....	.....	48	.....	.....	.....	.....	Not fixed
Allegheny,	Allegheny County Agricultural Asso.,	12,000	1 mile	135	732 93	.....	2,332 93	\$2,600 00	Sept. 28-29
Armstrong,	Kiskiminetas Valley Agricultural and Driving Association	16,725	1 mile	.....	1,762 00	.....	1,634 75	.....	Aug. 30-Sep. 2
Armstrong,	Dayton Agricultural and Mechanical Asso.,	22,000	1 mile	282	1,324 00	.....	1,839 85	2,500 00	Sept. 19-22
Beaver,	Beaver County Agricultural Association,	12,000	1 mile	360	1,527 55	.....	1,327 55	.....	Sept. 13-16
Bedford,	Bedford County Agricultural Society,	17,000	1 mile	206	1,000 00	.....	1,780 00	.....	Oct. 3-18
Berks,	Aranga's Place Agricultural Society,	10,000	1 mile	.....	.....	.....	.....	.....	Sept. 15-18
Berks,	Karlsruhe and Hort. Asso. of Berks County,	65,000	1 mile	2,581	2,050 00	.....	2,450 00	2,000 00	Sept. 12-15
Blair,	Karlsruhe Fair Association,	45,000	1 mile	.....	.....	.....	1,068 25	2,000 00	Aug. 22-25
Blair,	Blair County Grange Fair Association,	50,000	1 mile	15	1,170 00	.....	1,170 00	2,000 00	Sept. 25-29
Bradford,	Bradford County Agricultural Society,	12,000	1 mile	300	1,000 00	.....	1,580 00	3,500 00	Sept. 6-8
Bradford,	Troy Agricultural Society,	16,000	1 mile	3	.....	.....	1,006 15	2,000 00	Sept. 13-16
Bucks,	Bucks County Agricultural Society,	10,000	1 mile	16	968 91	.....	968 91	.....	Aug. 23-Sep. 1
Bucks,	Farmers' Picnic and Exhibition Asso.,	10,000	1 mile	90	.....	.....	340 00	.....	Sept. 1-2
Butler,	Chicoara Driving Park Association, Ltd.,	3,837	1 mile	48	560 05	.....	1,362 00	4,000 00	Sept. 8-11
Butler,	Butler Driving Park and Fair Association,	65,000	1 mile	.....	.....	.....	4,886 05	.....	Aug. 22-25
Butler,	North Washington Agricultural Asso.,	20,000	1 mile	60	1,287 75	.....	960 00	.....	Aug. 29-Sep. 1
Cambria,	Cambria County Agricultural Asso., Ltd.,	7,000	1 mile	382	1,094 33	.....	1,197 75	1,500 00	Sept. 12-15
Carbon,	Carbon County Industrial Society,	20,000	1 mile	46	1,094 33	.....	1,094 33	.....	Sept. 26-29
Centre,	Patrons of Husbandry,	16,000	1 mile	1,500	1,500 00	.....	232 00	.....	Sept. 9-16
Chester,	Chester County Agricultural Association,	16,000	1 mile	210	.....	.....	2,074 25	.....	Sept. 12-15
Clarion,	Clarion County Fair Association,	12,000	1 mile	470	.....	.....	1,207 00	1,136 62	Sept. 6-8
Clarion,	Licking Valley Agricultural Association,	3,000	1 mile	68	.....	.....	.....	.....	Sept. 29
Clearfield,	Clearfield County Agricultural Society,	14,000	1 mile	150	1,171 20	.....	1,171 20	4,000 00	Sept. 12-15
Columbia,	DuBois Driving Association,	75,000	1 mile	673	2,000 00	.....	8,717 01	.....	Sept. 28-29
Columbia,	Columbia County Agricultural and Horticultural Association, .....	.....	1 mile	.....	.....	.....	.....	.....	Oct. 3-6
Crawford,	Conemaugh Agricultural Association,	28,000	1 mile	327	1,808 90	.....	2,156 95	3,500 00	Aug. 28-Sep. 1
Crawford,	Oil Creek Agricultural Fair Association,	30,000	1 mile	300	2,000 00	.....	2,200 00	2,200 00	Sept. 12-15

Cumberland,	2,000	1 mile	70	1,000 00	1,375 50	1,600 00	Carlisle,	Sept. 19-22
Great Grangers' Picnic Exhibition,	150,000	1 mile	228	526 00	526 00	3,000 00	Williams Grove,	Aug. 28-Sep. 2
Middletown Fair Association,	15,000	1 mile	100	1,068 70	1,068 70	250 00	Middletown,	Aug. 15-18
Grata Agricultural and Hort. Society,	10,000	1 mile	130	250 00	250 00	250 00	Grata,	Sept. 19-22
Delaware,	16,000	1 1/2 mile	125	255 70	246 00	2,000 00	Media,	Nov. 24-25
Elk County Farmers' Agricultural Society,	30,000	1 mile	300	2,000 00	2,460 00	3,000 00	St. Marys,	Oct. 3-7
Erie,	3,000	1 mile	300	718 55	787 05	3,500 00	Corry,	Sept. 19-22
Greene,	4,800	1 mile	46	689 40	689 40	3,500 00	Watsonburg,	Sept. 6-8
Indiana,	40,000	1 mile	38	832 25	832 25	3,500 00	Carmichael,	Sept. 6-8
Jefferson,	20,000	1 mile	130	2,000 00	961 50	2,500 00	Indiana,	Sept. 28-Sep. 1
Jefferson County Agricultural Association,	25,000	1 mile	113	785 50	785 50	1,000 00	Piquetteville,	Aug. 12-15
Junata County Agricultural Society,	10,000	1 mile	93	1,000 00	1,033 00	2,000 00	Piquetteville,	Sept. 12-15
Lackawanna,	3,000	1 mile	29	113 50	148 00	148 00	Clark Summit,	Sept. 26-30
Lackawanna County Horticultural Asso.,	60,000	1 mile	352	400 00	4,075 00	6,500 00	Scranton,	Dec. 7-9
Lancaster County Agricultural Fair Asso.,	15,000	1 mile	90	1,000 00	1,327 00	2,000 00	Lancaster,	Sept. 26-29
Lawrence County Agricultural Association,	30,000	1 mile	900	1,000 00	6,019 40	6,019 40	Pulaaki,	Aug. 22-24
Lebanon,	20,000	1 mile	88	1,000 00	2,455 90	25,455 90	Lebanon,	Sept. 4-8
Lebanon Valley Fair Association,	2,800	1 mile	82	539 25	939 25	2,500 00	Allentown,	Sept. 19-22
Lehigh County Agricultural Society,	4,890	1 mile	100	1,701 62	1,951 90	2,500 00	Wilkes-Barre,	Dec. 4-9
Lehigh Valley Horticultural and Agricultural Association, Inc.,	18,000	1 mile	211	1,000 00	1,065 90	1,000 00	Dallas,	Sept. 5-8
Dallas Union Agricultural Association,	10,000	1 mile	250	2,000 00	2,253 30	2,500 00	Hughesville,	Oct. 10-13
Dallas County Fair Association,	25,000	1 mile	15	110 00	110 00	2,500 00	Stonewall,	Sept. 12-15
McKean County Agricultural Society,	1,197	1 mile	12	537 75	537 75	2,500 00	Mercer,	Sept. 26-29
Mercer County Agricultural Society,	16,000	1 mile	325	860 00	960 00	4,000 00	Lewisburg,	Sept. 19-21
Mercer Central Agricultural Society,	55,000	1 mile	100	1,015 70	1,970 56	4,000 00	Lewisburg,	Not fixed
Mifflin County Hort. and Agri. Asso.,	15,000	1 mile	400	500 00	512 95	2,500 00	Stouffville,	Sept. 28-Sep. 1
Monroe County Agricultural Society,	11,000	1 mile	940	2,040 00	2,040 00	2,500 00	Stouffville,	Aug. 28-Sep. 1
Montgomery County Fair Association,	1,400	1 mile	125	729 00	803 40	803 40	Stouffville,	Sept. 12-15
Northampton County Agricultural Society,	4,000	1 mile	60	426 25	426 25	800 00	Stouffville,	Sept. 27-29
Milton Fair and Northumberland County Agricultural Association,	5,000	1 mile	74	757 00	761 50	1,773 50	Stouffville,	Sept. 12-14
Perry County Agricultural Society,	4,000	1 mile	101	757 00	761 50	400 00	Stouffville,	Sept. 5-7
The Pennsylvania Horticultural Society,	12,800	1 mile	25	1,000 00	1,000 00	3,000 00	Stouffville,	Sept. 7-8
Somerset County Agricultural Society,	18,000	1 mile	48	1,000 00	2,233 00	2,500 00	Stouffville,	Sept. 12-15
Sullivan County Agricultural Society,	2,300	1 mile	90	1,000 00	1,300 00	1,500 00	Stouffville,	Sept. 19-22
Sullivan County Agricultural Society,	31,000	1 mile	40	2,240 65	2,240 65	2,500 00	Stouffville,	Oct. 17-20
Susquehanna,	60,000	1 mile	15	1,000 00	2,000 00	25,000 00	Stouffville,	Nov. 6-8
Susquehanna,	12,000	1 mile	15	100 00	999 35	2,500 00	Stouffville,	Sept. 5-6
Susquehanna,	15,000	1 mile	16	1,000 00	1,522 27	2,000 00	Stouffville,	Sept. 19-22
Toga,	10,000	1 mile	136	914 70	914 70	2,000 00	Stouffville,	Sept. 19-22
Toga,	10,000	1 mile	136	914 70	914 70	2,000 00	Stouffville,	Sept. 19-22
Union,	31,000	1 mile	40	2,240 65	2,240 65	2,500 00	Stouffville,	Sept. 19-22
Venango,	31,000	1 mile	40	2,240 65	2,240 65	2,500 00	Stouffville,	Sept. 19-22
Venango Farmers' and Fruit Growers' Association,	31,000	1 mile	40	2,240 65	2,240 65	2,500 00	Stouffville,	Sept. 19-22
Warren County Agricultural Association,	31,000	1 mile	40	2,240 65	2,240 65	2,500 00	Stouffville,	Sept. 19-22
Warren County Farmers' and Breeders' Association,	31,000	1 mile	40	2,240 65	2,240 65	2,500 00	Stouffville,	Sept. 19-22
Washington,	60,000	1 mile	15	1,000 00	2,000 00	25,000 00	Stouffville,	Sept. 19-22
Washington,	3,500	1 mile	15	100 00	999 35	2,500 00	Stouffville,	Sept. 19-22
Wayne County Agricultural Society,	12,000	1 mile	15	100 00	999 35	2,500 00	Stouffville,	Sept. 19-22
Westmoreland,	15,000	1 mile	16	1,000 00	1,522 27	2,000 00	Stouffville,	Sept. 19-22
Westmoreland Fair Association,	10,000	1 mile	136	914 70	914 70	2,000 00	Stouffville,	Sept. 19-22
Wyoming County Fair Association,	10,000	1 mile	136	914 70	914 70	2,000 00	Stouffville,	Sept. 19-22

List of County and Agricultural Societies with Names and Addresses of Presidents and Secretaries and Dates for holding Fall Exhibitions for 1916, etc.—Continued.

County	Name of Society	Attendance, 1915	Race track	Membership	Amount received from State fund	Premiums		Held 1916
						Paid, 1915	(Offered, 1916	
York.	York County Agricultural Society,	210,000	$\frac{1}{2}$ mile	250	.....	4,494 95	6,000 00	Oct. 2-6
York.	Hanover Agricultural Society,	60,000	$\frac{1}{2}$ mile	.....	.....	2,750 00	2,750 00	Hanover,
York.	New Freedom Farmers' Improvement Assoc.	10,000	.....	120	.....	250 00	250 00	New Freedom,
York.	Fen-Mar County Agricultural Association,	19,000	.....	78	457 00	534 55	650 00	Fawn Grove,
York.	Red Lion Fair Association,	8,800	.....	7	.....	424 70	525 00	Red Lion,
York.	Stewartstown Agricultural Association,	10,000	.....	.....	.....	450 00	450 00	Stewartstown,
	Total,	2,004,325	17,000	\$57,355 18	\$140,824 95	\$179,671 42	Sept. 12-15 Sept. 21-23 Aug. 4-11 Sept. 6-9 Sept. 6-8

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COMMONWEALTH OF PENNSYLVANIA

Pa

DEPARTMENT OF AGRICULTURE

DEC 15 1916

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BULLETIN No. 282

TABULATED ANALYSES OF

Commercial Fertilizers

FROM SAMPLES SELECTED IN ACCORDANCE

WITH ACT OF MAY 1, 1909

BY THE

PENNSYLVANIA DEPARTMENT OF AGRICULTURE

From January 1 to August 1, 1916

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER.
1916

OATH OF FERTILIZER SAMPLING AGENT.

Commonwealth of Pennsylvania, ss:

Personally appeared before me,
of.....County of.....and State
of Pennsylvania, who being duly sworn, according to law, doth de-
pose and say: That he has been duly appointed an agent of the De-
partment of Agriculture of Pennsylvania to collect samples of Com-
mercial Fertilizers for analysis, that he is not in any way interested
in the manufacture or sale of any fertilizer, and that he will per-
form the duties of the office with fidelity in accordance with the
requirements of law to the best of his ability, and as set forth in the
instructions issued by the Secretary of the Department of Agricul-
ture, governing the sampling of fertilizers in this State.

Sworn and subscribed before me, this }
.....day of..... }
A. D..... } (Signed),.....
..... }
..... }

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**The Act of 1st May 1909, Commonly Referred to as
"The New Fertilizer Law" is as Follows:**

No. 205.

AN ACT

To regulate the manufacture and sale of commercial fertilizers; prescribing penalties for its violation, and repealing an act, entitled "An act to regulate the manufacture and sale of commercial fertilizers; providing for its enforcement, and prescribing penalties for its violation," approved the twenty-fifth day of March, Anno Domini one thousand nine hundred and one.

Section 1. Be it enacted, &c., That every package of commercial fertilizer sold, offered, or exposed for sale, for manurial purposes within this Commonwealth, except the dung of domestic animals, lime, marl, and wood-ashes, shall have plainly stamped thereon the name and address of the manufacturer or importer and his place of business, the net weight of the contents of the package, the brand or trade-name of the fertilizer the package contains, and an analysis stating the percentage such fertilizer contains of nitrogen in an available form, of potash soluble in water, or soluble and reverted phosphoric acid, and of insoluble phosphoric acid.

Section 2. Every manufacturer or importer of commercial fertilizers, as specified in section one of this act, shall, on or before the first day of January of each year, or before offering them for sale in this Commonwealth, file annually with the Secretary of Agriculture a statement of the names and number of brands of such commercial fertilizers, having distinct trade-names, that he shall offer for sale during the next ensuing year, and a copy of the analysis of each one of such brands of commercial fertilizers, as required by section one of this act.

Section 3. In addition to the statement required by section two of this act, every manufacturer or importer of commercial fertilizers shall, on or before the first day of January of each year, or before offering them for sale in this Commonwealth, file annually with the Secretary of Agriculture an affidavit showing the amount of each brand of fertilizer, having a distinct trade-name, sold within the Commonwealth during the last preceding year; and if the said amount shall be one hundred tons or less, he or they shall pay or

cause to be paid to the Secretary of Agriculture the sum of fifteen dollars for each and every brand of such commercial fertilizer, having a distinct trade-name sold within the State during the last preceding year; and if the said amount shall exceed one hundred tons, and be less than five hundred tons, he or they shall pay the sum of twenty dollars, as aforesaid; and if the said amount shall be five hundred tons or more, he or they shall pay the sum of thirty dollars, as aforesaid. If such manufacturer or manufacturers, importer or importers, shall not have made any sales within the Commonwealth during the preceding year, he or they shall pay the sum of fifteen dollars upon each such brand, as aforesaid: Provided, That all monies so received shall be immediately paid by the Secretary of Agriculture into the State Treasury, for the use of the Commonwealth.

Section 4. No person shall sell, offer, or expose for sale, in this State, any pulverized leather, hair, ground hoofs, horns, or wool waste, raw, steamed, roasted, or in any form, as a fertilizer, or as an ingredient of a fertilizer or manure, without an explicit statement of the fact; said statement to be conspicuously affixed to every package of such fertilizer or manure, and to accompany and go with every lot, parcel, or package of the same.

Section 5. Any person or persons selling, offering, or exposing for sale, any commercial fertilizer or any brand of the same, having a distinct trade-name, without the analysis required by section one of this act, or with an analysis stating that it contains a larger percentage of any one or more of the above-named constituents than is contained therein, or for the sale of which all the provisions of sections two and three have not been complied with, or any person violating any of the provisions of section four of this act, shall be guilty of a misdemeanor, and, on conviction, shall be sentenced to pay a fine of not less than twenty-five nor more than one hundred dollars for the first offense, and not less than two hundred dollars for each subsequent offense. It shall be the duty of the Secretary of Agriculture to enforce the provisions of this act, and all penalties, costs, and fines recovered shall be paid to him or his duly authorized agent, and by him shall be immediately paid into the State Treasury, for the use of the Commonwealth.

Section 6. The Secretary of Agriculture is hereby empowered to collect samples of commercial fertilizers, either in person or by his duly qualified agent or representative, and to have them analyzed, and to publish the results for the information of the public; and for this purpose the said Secretary of Agriculture, such assistants, agents, experts, chemists, detectives,

and counsel as he shall duly authorize, shall have full access, ingress, and egress to and from all places of business, factories, barns, buildings, carriages, cars, and vessels, used in the manufacture and transportation, or sale, of any commercial fertilizer. They shall also have power to open any package or vessel containing or supposed to contain any commercial fertilizer, and take therefrom samples for analysis, upon tendering the value of said samples.

Section 7. The term "commercial fertilizers," as used in this act, shall be construed to mean any and every substance imported, manufactured, prepared, or sold for fertilizing or manuring purposes, except the dung of domestic animals, marl, lime, and wood-ashes, and not exempt by the provisions of section one of this act.

Section 8. This act shall go into effect on and after the thirty-first day of July, one thousand nine hundred and nine; and the act entitled "An act to regulate the manufacture and sale of commercial fertilizers; providing for its enforcement, and prescribing penalties for its violation," approved the twenty-fifth day of March, Anno Domini one thousand nine hundred and one, is hereby repealed.

Approved—The 1st day of May, A. D. 1909.

EDWIN S. STUART.

No. 95.

AN ACT

Making it unlawful for any person, firm, or corporation, engaged in the manufacture or sale of commercial fertilizers, to use the word "bone" in connection with, or as part of the name of, any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fertilizer shall be the product of pure animal bone; and providing a penalty for violation of the same.

Section 1. Be it enacted, &c., That it shall be unlawful for any person, firm, or corporation, engaged in the manufacture or sale of commercial fertilizers, to use the word "bone" in connection with, or as part of the name of, any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fertilizer shall be the product of pure animal bone.

Section 2. Any person or persons violating the provisions of this act shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall pay a fine of fifty dollars for the first offense, and a fine of not less than one hundred dollars, nor more than two hundred dollars, for every subsequent offense; such fine or fines to be paid into the State Treasury, for the use of the Commonwealth. The Secretary of Agriculture shall, together with his deputies, agents, and assistants, be charged with the enforcement of this act.

Section 3. All magistrates, aldermen, and justices of the peace throughout this Commonwealth shall have jurisdiction to hear and determine actions arising from violations of the provisions of this act, and shall have authority to hold for court, or to impose the penalty hereby prescribed, subject to appeal, as the law shall direct.

Section 4. This act shall go into effect on the first day of January, Anno Domini nineteen hundred and ten.

Approved—The 23d day of April, A. D. 1909.

EDWIN S. STUART.

LETTER OF TRANSMITTAL.

State College, Pa., July 18, 1916.

Hon. Chas. E. Patton, *Secretary of Agriculture, Harrisburg, Pa.:*

Dear Sir: I have the honor to transmit herewith my report upon the analyses of the samples of commercial fertilizers received from official sampling agents during the spring season of 1916.

Very respectfully,

WM. FREAR.

FERTILIZER ANALYSES JANUARY 1 TO AUGUST 1, 1916.

Since January 1, 1915, there have been received from authorized sampling agents one thousand five hundred seventy-two fertilizer samples, of which five hundred and six were subjected to analysis. Preference was given to those which have not been recently analyzed. In cases where two or more samples representing the same brand were received, equal portions from several samples were united, and the composite sample was subjected to analysis.

The samples analyzed group themselves as follows: 217 complete fertilizers, furnishing phosphoric acid, potash and nitrogen; 185 dissolved bones and other additional fertilizers furnishing phosphoric acid and nitrogen; 1 rock-and-potash fertilizer, furnishing phosphoric acid and potash; 66 acidulated rock phosphates, furnishing phosphoric acid only; 26 ground bones, furnishing phosphoric acid and nitrogen, and 10 miscellaneous samples, which group includes substances not properly classified under the foregoing heads.

The determinations to which a complete fertilizer is subjected are as follows: (1) Moisture, useful for the comparison of analyses, for indication of dry condition and fitness for drilling, and also of the conditions under which the fertilizer was kept in the warehouse. (2) Phosphoric acid—total and insoluble; the latter is, that portion not soluble in water nor in warm ammonium citrate solution (a solution supposed to represent the action of plant roots upon the fertilizer), which is assumed to have little immediate food value. By difference, it is easy to compute the so-called “available” phosphoric acid. (3) Potash soluble in water—Most of that present in green sand marl and crushed minerals, and even some of that present in vegetable materials such as cotton-seed meal, not being included because insoluble in water even after long boiling. (4) Nitrogen—This element is determined in such manner as to ascertain its *total* quantity and also, the quality of the organic nitrogenous material present in the finished fertilizer. The fertilizer is washed thoroughly with water, which removes the nitrates, ammonium salts and almost all of the cyanamid nitrogen, and the soluble organic nitrogenous materials. These are not separately determined but are grouped under the name “*water-soluble nitrogen*.” The quantity of *water-insoluble nitrogen* is directly determined, and by difference between its amount and the total nitrogen, the water-soluble nitrogen is calculated. Another

portion of water-insoluble material* is treated with alkaline potassium permanganate, which attacks the nitrogenous organic substances present, and converts the more active portion into ammonia, which is distilled off, determined, and its nitrogen calculated as "*active insoluble nitrogen*." The "*inactive insoluble nitrogen*" is then computed by subtracting the active insoluble from the total insoluble nitrogen. The term "available nitrogen" as used in this report, is the sum of the water-soluble and the active insoluble nitrogen. It is equivalent to the total nitrogen less the inactive insoluble nitrogen. In high grade organic nitrogenous materials, among which, from its behavior with this treatment, must be included horn meal, the percentage of inactive nitrogen in the insoluble nitrogen is usually under 40 per cent.; and the ratio of inactive to active insoluble nitrogen in such materials is usually less than 60:100. On the other hand, in the case of low-grade nitrogenous materials, the proportions of inactive nitrogen are much higher. The separations effected by these methods are therefore of great value in distinguishing whether the insoluble nitrogen is derived from high grade materials, or from low grade substances such as garbage tankage, peat, mora meal, unacidulated hair, leather, etc. There is, however, one fertilizer ingredient rapidly coming into use, whose presence may lead to erroneous conclusion, if judgment is based solely upon the facts ascertained by the foregoing method, namely, cyanamid. This substance contains from 13 to 16.5 per cent. of nitrogen, of which 12 to 14.7 per cent. is soluble in water, by the mode of treatment used in the alkaline permanganate method; and, of the 1.0 to 1.7 per cent. of water-insoluble nitrogen, less than one-fifth is active; so that the ratio of inactive to insoluble nitrogen is about 80:100. Owing to its tendency to reduce the availability of the phosphoric acid in acid phosphate mixtures, limited quantities only of this ingredient can be used advantageously in mixed fertilizers. Nevertheless, in cases where low grade sources of nitrogen are indicated by the foregoing method, it would be needful to determine, by supplementary tests, whether or not cyanamid may be present to account for an undue proportion of inactive, insoluble nitrogen, before concluding that such excess of inactive nitrogenous material is attributable to low-grade nitrogenous constituents. It is desirable to keep in mind at this point the fact also that certain widely used low-grade nitrogenous substances, such as garbage tankage, peat and mora meal, are not included in the list of substances whose presence requires specific declaration under Section 4 of the Fertilizer act. (5) Chlorin—This determination is made to afford a basis for estimating the proportion of the potash that is present as chlorid

*This determination has been omitted in all cases where the insoluble nitrogen is only .3 per cent. or less.

or muriate, the cheaper source. The computation is made on the assumption that the chlorin present, unless in excess, has been introduced in the form of muriate of potash; but doubtless there are occasional exceptions to this rule. One part of chlorin combines with 1.326 parts of potash to form the pure muriate; knowing the chlorin, it is, therefore, easy to compute the potash equivalent thereto. (7) In the case of ground bone, the state of sub-division is determined by sifting through accurately made sieves; the cost of preparation and especially the promptness of action of bone in the soil depend very largely on the fineness of its particles, the finer being much more quickly useful to the plant.

The analytical details for incomplete fertilizers are similar to the foregoing, except as one or another constituent is absent, and diminishes the scope of examination required.

The legislation of 1909 has made needful some additional tests. Section 4, of the Act of May 1, 1909, prohibits the sale of "pulverized leather, hair, ground hoof, horns, or wool waste, raw, steamed, roasted, or in any form, as a fertilizer, or as an ingredient of a fertilizer or manure, without an explicit statement of the fact." All nitrogenous fertilizers have, therefore, been submitted to a careful microscopic examination, at the time of preparing the sample for analysis, to detect the presence of the tissues characteristic of the several materials above named.

The act of April 23, 1909, makes it unlawful to use the word "bone" in connection with, or as part of the name of any fertilizer, or any brand of the same, unless the phosphoric acid contained in such fertilizer shall be the product of pure animal bone. All fertilizers in whose name the word "bone" appears, were therefore examined by microscopic and chemical methods to determine, so far as possible with present knowledge, the nature of the ingredient or ingredients supplying the phosphoric acid. It is a fact, however, well known to fertilizer manufacturers and which should be equally understood by the consumer, that it is, in certain cases, practically impossible to determine the source of the phosphoric acid by an examination of the finished fertilizer. The microscope shows clearly the structure of raw bone, but does not make it possible to discriminate between thoroughly acidulated bone and acidulated rock. The ratio of nitrogen to phosphoric acid in a raw bone—and only such bone as has not been deprived of any considerable proportion of its nitrogenous material by some manufacturing process can properly be called "pure animal bone"—is about 1:8. In cases where the ratio of phosphoric acid to nitrogen exceeds 8, it is clear that part, at least, of the phosphoric acid has been supplied by something else than pure animal bone; but, inasmuch as nitrogen may have been introduced in some

material other than bone and no longer detectible by the microscope, the presence of nitrogen and phosphoric acid in the proportions corresponding to those of bone is not proof positive that they have been supplied by bone. Finally, the differences in the iron and silica content of bone and rock respectively, afford means of distinction useful in some cases; the usefulness of this distinction is limited, however, by the facts that kitchen bone frequently contains earthy impurities rich in iron and silica, and that earthy fillers can legally be used in fertilizers and are in fact considerably used therein both as "make-weights" and as "conditioners," or materials introduced to improve the drilling qualities of the goods. The fact that the phosphoric acid in bone and rock is identical in character is probably so well known as to require no detailed consideration in this connection.

The law having required the manufacturer to guarantee the amount of certain valuable ingredients present in any brand he may put upon the market, chemical analysis is employed to verify the guaranties stamped upon the fertilizer sacks. It has, therefore, been deemed desirable in this report to enter the guaranty filed by the manufacturer in the office of the Secretary of Agriculture, in such connection with the analytical results that the two may be compared. An unfortunate practice has grown up among manufacturers of so wording the guaranty that it seems to declare the presence in the goods of an amount of valuable constituent ranging from a certain minimum to a much higher maximum; thus, "Potash, 2 to 4 per cent." is a guaranty not infrequently given. In reality, the sole guaranty is for 2 per cent. The guaranteed amounts given for each brand in the following tables, are copied from the guaranties filed by the maker of the goods with the Secretary of Agriculture, the lowest figure given for any constituent being considered to be the amount guaranteed. For compactness and because no essentially important fact is suppressed thereby, the guaranties for soluble and reverted phosphoric acid have not been given separately, but are combined into a single guaranty for available phosphoric acid; in cases where the maker's guaranty does not specifically mention available phosphoric acid, the sum of the lowest figures given by him for soluble and reverted phosphoric acid is used. The law of 1879 allowed the maker to express his guaranty for nitrogen either in terms of that element or in terms of the ammonia equivalent thereto; since ammonia is composed of three parts of hydrogen and fourteen parts of nitrogen, it is a very simple matter to calculate the amount of one, when the amount of the other is given; the amount of nitrogen multiplied by 1.214 will give the corresponding amount of ammonia, and the amount of ammonia multiplied by 0.824 will give the corresponding amount of nitrogen. In these tables, the expression is in terms of nitrogen.

The laws of 1901 and 1909 abolished the alternative and required that the quantity shall be given in terms of nitrogen.

Many manufacturers, after complying with the terms of the law, insert additional items in their guaranties, often with the result of misleading or confusing the buyer; the latter will do well to give heed to those items only that are given as the law requires and that are presented in these tables:

Summary of Analyses Made This Season (Spring, 1916).

	Complete fertilizers.	Rock and potash.	Acidulated fertilizers supplying phosphoric acid and nitrogen.	Dissolved rock.	Ground bone.
Number of analyses,	217	1	135	66	216
Moisture, per cent.,	7.52	4.28	6.90	8.41	5.87
Phosphoric acid:					
Total, per cent.,	10.53	5.33	11.97	16.19	22.16
Available, per cent.,	9.32	4.82	10.61	15.46	.....
Insoluble, per cent.,	1.21	.51	1.36	.73	.....
Potash, per cent.,	1.17	.62	.....	.....	.....
Nitrogen, per cent.,	1.86	.....	1.86	.....	2.08
Mechanical analysis of bone:					
Fine (per cent.), .....	.....	.....	.....	.....	47
Coarse (per cent.), .....	.....	.....	.....	.....	53
Average selling price,	\$28.24	\$16.30	\$23.61	\$18.27	\$36.30

The unusual conditions of raw materials supply, due to the disturbances of the European war, have very greatly modified the average character of the fertilizers sold in Pennsylvania, both with respect to the distribution of the market brands among the several classes of fertilizers, and also to the average composition of certain classes. The percentage proportions of the several classes of fertilizers analyzed in Pennsylvania during the past five seasons was:

	Complete.	Rock and potash.	Dissolved bone.	Dissolved rock.	Ground bone.	Miscellaneous.
1914, Spring,	67.3	17.4	.5	4.0	3.1	7.7
Fall,	62.5	22.0	.4	2.4	5.1	1.6
1915, Spring,	69.2	14.1	1.5	7.9	3.9	3.4
Fall,	61.7	12.4	8.7	10.3	5.0	1.9
1916, Spring,	42.9	.2	36.6	13.0	5.1	2.0

The changes here shown are caused, almost entirely, by the potash scarcity due to the cutting off of the German potash salt imports, but are due in part also to the larger raw materials requirements of the munitions makers of this country. Fertilizer manufacturers have tried to eke out their supplies of potash salts, first, by diminishing the number of brands in which potash was offered; second, as the succeeding table shows, by reducing the percentage of potash in those brands for which it has been retained; and, third, by dropping almost entirely the supplying of potash salts to home-mixers. The present season shows the most extensive readjustment due to this cause; in fact, it shows the absence from the market of the class known as "rock-and-potash"; a one-third reduction of the completes, and a greatly increased number of brands offering only available phosphoric acid and nitrogen.

Composition, 1914-1916.

	Phosphoric acid. Total.	Potash.	Nitrogen.
	%	%	%
Complete fertilizers:			
1914, Spring,	9.31	5.07	1.81
Fall,	9.34	3.42	1.29
1915, Spring,	10.56	3.05	1.95
Fall,	10.41	1.94	1.28
1916, Spring,	10.59	1.17	1.85
Rock-and-potash:			
1914, Spring,	10.69	4.77	.....
Fall,	11.18	3.50	.....
1915, Spring,	12.35	2.18	.....
Fall,	12.07	1.87	.....
1916, Spring,	5.33	.62	.....

The rock-and-potash figure for the present season represents only one brand, and that of unusual composition throughout. Out of 215 brands of fertilizers for which potash was guaranteed, only 12 guarantees were for 2 per cent. or over; 182 for 1 to 1.5 per cent., usually the former; while in 16 cases only 0.5 per cent. was guaranteed, and in 5 cases 0.25 per cent.

A farmer applying 300 pounds of the brands last mentioned, would add *less than one pound* of potash to an acre of land. This is an excellent time for the observant crop grower to form a judgment concerning the agricultural value of the potash he has heretofore been buying for application to his grain, grass and even his potato lands. The potash-rich special brands for vegetables, fruit and to-

bacco have utterly disappeared, not merely as the result of the potash shortage, but also because of the possibility of making them was sacrificed for the purpose of retaining a large number of general purpose brands for each of which a little potash could be guaranteed.

Departures from Guaranty.

For the purpose of indicating more specifically to the eye, cases deficient from guaranty, an asterisk has been affixed in the analytical tables where the ingredient has been found less in quantity than the manufacturer guaranteed. Too great emphasis should not be placed upon very slight deficiencies, because very slight imperfections in mixing and slight variation in analysis are practically unavoidable. The asterisk has been used, therefore, only in cases where the deficiencies amount to 0.2 per cent. or more, except where nitrogen has been guaranteed in amounts no higher than 1.0 per cent., in which case an asterisk has been affixed where the deficiency amounts to 0.1 per cent. or more.

The cases of departure of goods from their guaranteed composition observed this season, including only those cases in which it amounted to 2-10 per cent. or more were as follows:

Summary of Instances of Deficiency from Guaranty.

	Complete fertilizers.	Rock and potash.	Dissolved bone, etc.	Dissolved rock.	Ground bone.
Deficient in four constituents,	0	0	0	0	6
Deficient in three constituents,	1	0	0	0	0
Deficient in two constituents,	4	0	3	3	1
Deficient in one constituent,	27	0	23	5	7
Total number of samples in which deficiencies occur, ..	32	0	26	7	8

The cases of deficiency noted during the past nine seasons in the composition of goods as compared with their guaranties, expressed in percentage of the total number of goods of each class analyzed, are as follows:

Percentage of Deficiency, 1911-1915.

	Fall, 1911.	Spring, 1912.	Spring, 1913.	Fall, 1913.	Spring, 1914.	Fall, 1914.	Spring, 1915.	Fall, 1915.	Spring, 1916.
Complete fertilizers,	46.9	39.0	32.3	36.0	22.1	27.1	21.3	29.1	14.7
Dissolved bone, etc.,	100.00	50.0	50.0	66.7	50.0	0.0	14.0	21.9	15.0
Rock and potash,	48.4	33.6	28.4	46.0	26.7	25.3	14.0	21.9	8.0
Dissolved rock,	11.9	13.5	20.9	23.5	23.3	13.9	14.7	10.2	16.6
Ground bone,	20.0	29.2	25.0	22.3	47.3	21.3	12.5	24.2	26.9
All classes except miscellaneous, ...	46.0	36.0	30.4	36.0	23.0	23.0	19.6	23.0	16.5

A comparison of the average composition of all samples of complete fertilizers for which guaranties are recorded with the average of the corresponding guaranties, for several seasons past, including those of this season, follows:

Average Composition and Guaranty Compared.

	Average composition. Per cent.	Average guaranty. Per cent.
Spring, 1912.		
Phosphoric acid:		
Total,	6.51	8.32
Available,	6.09	7.78
Potash,	5.34	5.05
Nitrogen,	1.55	1.58
Fall, 1912.		
Phosphoric acid:		
Total,	9.90	9.07
Available,	8.25	7.83
Potash,	4.06	3.57
Nitrogen,	1.38	1.30
Spring, 1913.		
Phosphoric acid:		
Total,	9.71	8.93
Available,	8.11	7.37
Potash,	5.41	5.17
Nitrogen,	1.61	1.62
Fall, 1913.		
Phosphoric acid:		
Total,	9.36	9.09
Available,	8.06	7.83
Potash,	4.28	4.27
Nitrogen,	1.47	1.35
Spring, 1914.		
Phosphoric acid:		
Total,	9.31	8.71
Available,	8.06	7.65
Potash,	5.67	5.52
Nitrogen,	1.31	1.69
Fall, 1914.		
Phosphoric acid:		
Total,	9.34	9.25
Available,	8.41	8.00
Potash,	3.42	2.99
Nitrogen,	1.29	1.27

Average Composition and Guaranty Compared—Continued.

	Average composition. Per cent.	Average guaranty. Per cent.
Spring, 1915.		
Phosphoric acid:		
Total,	10.56	9.34
Available,	9.05	8.09
Potash,	3.06	3.12
Nitrogen,	1.95	1.82
Fall, 1915.		
Phosphoric acid:		
Total,	10.41	9.21
Available,	9.11	7.89
Potash,	1.94	1.88
Nitrogen,	1.29	1.15
Spring, 1916.		
Phosphoric acid:		
Total,	10.53	9.40
Available,	9.22	8.40
Potash,	1.17	1.05
Nitrogen,	1.85	1.67

MATERIALS USED IN FERTILIZERS.

The sampling agents report no case of declaration under the requirements of Section 4 of the fertilizer law, nor has microscopic examination shown any decisive evidence of the presence in any fertilizer of more than accidental traces of any of the substances specified in that section.

On the other hand, the results of the examination of the condition of the nitrogen in the complete fertilizers by the alkaline permanganate method affords much that is suggestive.

To keep the tables down to convenient size, the percentages of active insoluble nitrogen found have been omitted. They can be computed, however, from the figures given, by deducting from the total nitrogen the sum of the soluble and the inactive insoluble nitrogen. The ratio which the active insoluble bears to the inactive insoluble nitrogen being the principal indication the method as here used gives respecting the character of the organic nitrogenous ingredients of the fertilizer, the index letters, 'a,' 'b,' and 'c' (or equivalent characters) have been affixed to the percentages of inactive insoluble nitrogen, to indicate the ratios between the active and inactive insoluble in the several samples. Cases in which the active constitutes

three-fifths or more of the insoluble are marked 'a'; two-fifths to three-fifths, 'b,' and less than two-fifths, 'c.' The New England Stations use the terms 'good,' 'doubtful' and 'poor' for these respective classes of cases.

Of the 386 samples examined this season, 182 belong to class 'a,' 172 to 'b,' and 32 to 'c.'

It is needful to keep clearly in mind the meaning of the index 'c' as thus applied. Its presence does not suffice to indicate that the fertilizer contains no readily available nitrogen, but merely that part or all of the insoluble nitrogen is derived from low-grade sources, barring cases in which cyanamid is one of the fertilizer ingredients. These low-grade materials may be such as are listed in Section 4 of the law, or others in common use, such as garbage tankage, peat or mora meal; and they may, if of animal origin, have had their nitrogenous materials changed almost entirely to an available condition by 'wet mixing,' which has, however, little improving effect upon the nitrogenous constituents of garbage tankage and mora meal, and little more upon those of peat.

The use of such low-grade materials is either to make the fertilizer less likely to become sticky or lumpy, or to supply nitrogen from materials that would otherwise be wholly thrown to waste. The use of 'conditioners' for the former purpose is, in itself, desirable rather than objectionable; but becomes obnoxious and unjust when the nitrogen they contain in unavailable form is made the basis of a charge at high rates to the buyer. The use also of low-grade and therefore cheap nitrogen supplies whose nitrogen has, by chemical treatment, been made useful for plant-food, is laudable provided the materials are sold for what they are.

In cases where the inactive insoluble nitrogen forms a large fraction of the total nitrogen, is marked by the index 'c,' the guaranty does not exceed the available nitrogen by an amount equal to most of the 'inactive,' and the selling price, corrected for freight difference, is not considerably less than that asked for fertilizers of like general composition but supplying nitrogen derived from high-grade goods such as bear the index 'a' or even 'b,' there is reason to believe that the buyer is being subjected to unfair treatment.

Section 1 of the Fertilizer Law of 1909 requires that the guaranty for a fertilizer shall state 'the percentage such fertilizer contains of nitrogen in an available form.' It is, however, by no means clear that the term 'available,' as used in the law, means precisely the same thing that is meant by that term when used to designate the sum of the water-soluble and active insoluble nitrogen, as determined by the present method. For some nitrogenous fertilizer ingredients always regarded as of high grade, such as dried blood, meat tankage,

and cottonseed meal, contain considerable fractions of inactive insoluble nitrogen when examined by this method. Until further notice, therefore, the law will not be construed to require that the amount of nitrogen guaranteed shall not exceed that present in a form that will appear as 'available' by the alkaline permanganate method now in use.

In many of this season's samples, however, the quantity of nitrogen thus available is found equal to the percentage guaranteed. On the average, the 'available' nitrogen found was 1.54 per cent., the total 1.85, the guaranteed, 1.67 per cent.

FERTILIZER RAW MATERIALS.

The market prices for the contract season, September 1, 1915, to March 1, 1916, have been exceptionally difficult to ascertain. A rough approximation is obtained from the files of the *Oil, Paint and Drug Reporter*, of New York City.

Average Wholesale Prices, September 1 to March 1.

Substance.	Amount Priced.	Average price Sept. 1, 1914, to March 1, 1915.	Average price Sept. 1, 1915, to March 1, 1916.	Prices, Sept.-March, 1915-16, in per cent. of prices of 1914-15.
Sulphate of Ammonia,	Cwt.,	\$2.743	\$3.699	134.9%
Nitrate of Soda,	Cwt.,	1.937	3.063	157.9%
Dried Blood, H. G.,	Unit* (20 lbs.),	3.089	3.283	106.6%
Concentrated Tankage,	Unit* (20 lbs.),	2.943	3.775	128.3%
Rough Bone,	Ton,	23.25	23.25	100.0%
Bone Meal,	Ton,	29.25	29.25	100.0%
Fish Ground (Dry),	Unit* (20 lbs.),	3.23	3.439	106.5%
Phosphate Rock, Tenn.,	Ton,	5.25	5.25	100.0%
Acid Phosphate,	Unit (20 lbs.), .....	.475	.724	152.4%
Double Manure Salt,	Ton,	Not quoted	105.00	.....
Sulphate of Potash,	Ton,	Not quoted	323.80	.....
Kalnit,	Ton,	Not quoted	45.00	.....
Muriate of Potash,	Ton,	Not quoted	390.40	.....
Sulphuric Acid, 66° B.,	Cwt.,	1.06	2.342	223.0%

*The unit here is 20 lbs. of ammonia, equivalent to 16.5 pounds of nitrogen.

According to these quotations, the ammoniates and phosphate rock produced in this country showed little price change; but sulphate of ammonia, nitrate of soda and potash salts, the last two all

imported, and the first partly so, showed large, and in the case of the potash salts, enormous increases. Sulphuric acid, though itself made in America, jumped to a high price level; and, as a result, added 50 per cent. to the price of acid phosphate. Concentrated tankage was the only raw material for which a lower price was quoted during the last contract season, and the reduction in that case was but slight.

Within the contract season, according to this source of information, ammonium sulphate began to advance in November, and the monthly price average thereafter showed a continuous increase. Nitrate of soda began its advance in February, 1915, gained slowly but fairly steadily until September, and then advanced rapidly through the season. Sulphuric acid, 66° Baume, which had for some years been quoted without change at \$1.05 a hundredweight, jumped to \$1.625 in January, 1915, to \$2.125 in September last, and reached \$2.75 early in January of this year. Muriate of potash was quoted at \$39.07 when the European war began, and then, of course, began to rise, to \$39.57 about the middle of August, 1914, where it held until January, 1915, after which the change was so rapid that quotations were, for a time, omitted. In March, 1915, it reappeared at \$118.50; July 1st, at \$240.00; November 8th, at \$400.00; December 13th, \$577.50; and, thereafter, declined to \$455.00, the last of February. Sulphate of potash, which, under normal conditions, is always more expensive than the muriate, suffered a relative depreciation because of the munition advantages of the muriate. The sulphate was quoted at \$47.57 in July, 1914; at \$125.00 in March, 1915, and reached \$440 by the first of December last, from which high point it receded to \$337.50 by the last of February, 1916. It is clear from these quotations, that the quoted price for muriate in December last was about fifteen times the price quoted at the beginning of the war; that for the sulphate, between nine and ten times as great. The price changes for kainit, while great, have been much less than those for the purer salts. Quoted at \$8.36 in July, 1914, it arose to \$8.56 by August 17th, and there held until January, 1915, when quotations ceased until last August, when they reappeared at \$45.00. The price history of double manure salt was much like that of kainit, namely, July, 1914, \$25.04; January, 1915, \$25.54; March, \$55.00; July 26, \$105.00, the quotation now standing.

All these later quotations are special sale quotations. The amounts changing hands are not great, and the prices quoted probably do not represent the true sale price averages, under the extremely unusual conditions. When there are few lots of a commodity changing hands, price quotations are of relatively small value.

The fact that our commercial potash supply has, for years, been almost exclusively obtained from Germany; that she, early in the

war, placed an embargo upon potash shipments; that heavy munitions contracts placed with American manufacturers created a large and unusual demand upon the potash stocks here accumulated; and that no American potash sources existed capable of quick utilization, are enough to account for the potash supply situation.

With respect to our ammonium sulphate, nitrate of soda and sulphuric acid, another fact chiefly determined price changes. While we manufacture a good deal of ammonium sulphate and throw away in our furnace and coke oven furnace a vast amount, a large fraction of that heretofore used in our manufactures has been imported from England, and, after a time, she placed an embargo on these shipments to save the product for her own use. Our nitrate of soda comes exclusively from Chili and Peru; for we have in the States no supply that can be utilized by present methods in competition with the usual South American prices, and none at all that can be made quickly available by a simple manufacturing plant. The sulphur for our sulphuric acid was once chiefly obtained from the volcanic deposits of Sicily, but the sulphur burners in our factories were later almost entirely replaced by pyrites furnaces; the pyrites, iron sulphide, were in some measure obtained from Virginia, more largely from Nova Scotia; but chiefly from the rich deposits of Huelva, Spain. It is true that in the sulphur beds a thousand feet below the surface of the island of Calcasieu, Louisiana, which the engineering genius of Fraasch has made available, America has what is potentially the sulphur pre-eminence of the world; but this is simply a future possibility, with the requirements of much time and a large, fixed capital investment—neither of which requirements can be met when we are in a hurry to provide for a temporary condition. We waste more sulphur than ammonia in furnace and coke oven fumes. To protect our forests and fields from destruction, smelters have been required to purify their gaseous products. The result of this recent requirement is that about one-fifth of our total sulphuric acid output comes from a few smelters. Here, too, however, time and fixed capital investment are involved in plant enlargement, and fail us under such conditions as now exist. In the second place, the acid demand of the munition makers has been enormous; and while our acid output has greatly increased to meet this enlarged demand, the difficulty of securing Huelva pyrites in sufficient amount limited the output and largely dominated the price situation.

Various conditions at the source to some extent, of course, affected the prices of these imported commodities; but the great price addition to the importer was due to the altered conditions of ocean transportation. According to a recent study of these conditions the war has resulted in the diversion from mercantile use of 15 million out

of the world's total of 40 million tons of ocean freight bearing capacity; in the creation of an unprecedented export from this and other neutral countries to certain European open ports, and in greatly increased marine insurance rates. All of these influences have tremendously raised ocean transportation costs. Still another factor has added to the freight cost of nitrate of soda, namely, the closure by slides in the Culebra cut of the Panama Canal, as the result of which vessels laden with this product have carried their loads to our eastern coast by the way of Cape Horn, with a large additional charge for the extra cost of this longer journey.

It is difficult, in the few sentences that may here be given to the subject, to picture the changes in American industry due to these conditions, as these changes affect the fertilizer trade. Despite raw materials difficulties, every abandoned sulphuric acid plant that could be put into operation was set to work and immense new plants have been built. In 1915, according to the report of the U. S. Geological Survey, we made 4 million tons of sulphuric acid, as compared with about 1.5 million in 1909. The higher prices stimulated our ammonium sulphate manufacture, so that, though the English embargo is now modified, we are taking little of England's product. In April, 1916, we imported twice as much nitrate of soda as in the same month of 1915, despite the higher prices. There has been much endeavor, with but slight success, to find and develop our most available potash resources. Meanwhile, our brokers have scoured the world for re-sale stocks with which to supply our potash needs. Our export grades of rock phosphate have lost, for the present, much of their foreign market. Owing to the potash shortage, the changes in brand composition, and the higher prices, fertilizer sales have fallen off.

Finally, another very important fact must be mentioned that is of vast possible influence upon our manufactures. The European countries, which in a sudden time of need turned to us for an unusual volume of certain commodities, began earnestly to develop their own production, and have so far succeeded that they are now placing relatively few new orders with us, or buying only at lower prices. Already, the heavy demands of the late months of 1915, have fallen off, and prices are seeking lower levels. Muriate of potash, which then brought \$475 to \$500 a ton is now being offered by some brokers in small resale lots as low as \$3.75 a unit. Sulphuric acid prices are becoming easier, after the tremendous jumps they took from October to February last, and some plants have already shut down.

FERTILIZER VALUATIONS.

Those charged with the responsibility of making official valuations for commercial fertilizers have hitherto established price schedules for fertilizer constituents for use during the entire year of their publication. These schedules have been based upon the wholesale prices ruling during the preceding contract season and also upon such trustworthy semi-retail quotations as were available. The officers of the Experiment Stations of New England, New Jersey and New York fixed the schedule for their own states at an annual conference. At the meeting of March, 1916, these officers, after considering the lack of thoroughly representative data for raw materials costs during the past contract season, and also the existence of conditions which would probably lead to unsettled prices during the latter part of this calendar year, formally adopted a resolution declaring the impracticability of fixing a schedule of valuations for the present year.

Pennsylvania has, so far as her somewhat different system of valuation and her different market conditions would permit, used the New England schedule as a valuation basis. After conference between the Secretary of Agriculture and the writer, it has been deemed wise to abandon attempts at detailed valuation of Pennsylvania samples for the current year; for under existing conditions, any figure that might be used was likely to be either misleading or unjust to the retail buyer, or unfair to the seller.

Nevertheless, it is desired that the users of fertilizers shall have the best view we can give, of retail price conditions. If we assume, for the purpose of approximation, that in all goods but the ground bone and miscellaneous materials, the available phosphoric acid was supplied exclusively in acidulated phosphate, potash in muriate of potash, and nitrogen from a single source, the averages for composition and for selling price afford us the basis for computing the actual selling price of each of the three constituents. If we deduct from the final retail prices, the allowances for freight, local agents' commissions, mixing and bagging, the approximation will be to jobbers' prices.

Thus the average acidulated phosphate analyzed this season contained 15.46 per cent. of available phosphoric acid and cost \$18.27 a ton. The retail price is equivalent to \$1.17 a unit (20 pounds or one per cent. of a ton) or 5.9 cents a pound for available phosphoric

acid. The jobbers' price, that is, the retail price less allowances for freight, commission and bagging, as usually figured would be \$10.22 a ton, 66.1 cents a unit, or 3.3 cents a pound.

The average acidulated fertilizer supplying phosphoric acid and nitrogen contained 10.61 per cent. of available phosphoric acid and 1.86 per cent. of nitrogen and cost \$23.61 a ton at retail. At \$1.17 a unit, the 10.61 per cent. or units of available phosphoric acid would take up \$12.41 of the retail cost, leaving \$11.20 cents to pay for the nitrogen. At 1.86 per cent., this means \$6.02 a unit, or 30 cents a pound retail for this constituent. Taking off retailing allowances, the computed jobbers' price is \$16.01 a ton; 10.61 units of available phosphoric acid on a jobbers' basis of 66.1 cents, equals \$7.01 for this constituent, which leaves \$9.00 to pay for the nitrogen (1.86%); and the corresponding jobber's value for the nitrogen is \$4.84 a unit, or 24 cents a pound.

The average complete fertilizer contained 9.32 per cent. of available phosphoric acid, 1.85 per cent. of nitrogen, and 1.17 per cent. of potash, and cost at retail \$28.24. Using the retail prices as above calculated, of \$1.17 a unit for phosphoric acid and \$6.02 a unit for nitrogen, the amounts of these constituents found in the average complete fertilizer would cost \$10.90 and \$11.04, respectively, or together \$22.04. This leaves \$6.20 to pay for the potash (1.17 per cent.) and is equivalent to \$5.15 a unit or 26 cents a pound. The jobber's price basis (\$19.87 a ton) computed as in the foregoing cases, would yield \$4.74 for the potash, or \$4.05 a unit or 20 cents a pound.

The foregoing method of calculation ignores the customary distinction between the prices of phosphoric acid in acidulated rock and in complete fertilizers that derive most of their phosphoric acid from bone. For years, owing to the differences in market values of these two phosphoric acid supplies, the available phosphoric acid from bone has been assigned a valuation about one-fifth higher than that from rock. If we figure the prices of ingredients in complete and in available phosphoric acid and nitrogen fertilizers on the basis of 7 cents a pound for available phosphoric acid, we get for the nitrogen and potash, the following retail prices: Nitrogen, 23.5 cents; potash, 27.7 cents. The nitrogen price thus obtained is more nearly in accordance with the New York wholesale quotations, than is that obtained by the mode of calculation first applied.

Accepting the results of the first described method for acid phosphate, and the modified method for the other two classes of goods,

we have the following retail prices applicable to cases where the freight for car load lots is \$2.00 a ton:

	Unit.	Pound, Centa.
Available phosphoric acid:		
In rock goods,	\$1.17	5.9
In bone goods,	1.40	7.0
Potash,	5.44	27.7
Nitrogen,	4.71	23.5

Early in the season it was rumored that prices to the retailer might run about \$1.00 a unit for available phosphoric acid in goods containing 16 per cent. or more of available, with a deduction of 50 cents a unit for every per cent. shortage in this constituent; \$5.00 a unit for potash and \$4.00 a unit for nitrogen. This would mean a minimum pound price of 5 cents for available phosphoric acid and fixed prices of 25 and 20 cents a pound, respectively, for potash and nitrogen. These rates applied to the average percentage obtained this season, would yield \$19.23 for complete fertilizers, vs. \$19.87, as above calculated; for other fertilizers containing available phosphoric acid and nitrogen, \$15.35 vs. \$16.01; and for dissolved rock phosphate, \$15.19 vs. \$10.22. It is evident that prices for complete fertilizers and those supplying available phosphoric acid and nitrogen ran very close to those indicated in the first sentence of this paragraph, but that acid phosphate itself was sold at a relatively much lower figure by the retailer. The actual jobber's price for acid phosphate undoubtedly averaged more than \$10.22, so far as we can judge from quotations known to us.

In general, the retail buyer can form a fair judgment of the nearness to average cost of the price he paid for his fertilizers of any of the preceding classes if he will multiply the guaranty figures on the fertilizer sacks by their respective prices given in the second paragraph preceding, \$1.17 for available phosphoric acid, by \$6.02 for nitrogen, and by \$7.17 for potash, taking the sum of the products as representative for a locality where freights from the factory cost \$2.00 a ton by the carload lots, and increasing or diminishing the sum by the excess or deficiency from this freight allowance of his local freight rate on the carload basis from Baltimore or Philadelphia.

Bone values have considerably increased, this year. The following comparison of composition, fineness and cost for the past five seasons will make clear present prices relative to those of recent years:

	Composition.		Fineness.		Retail Price.
	Phosphoric acid.	Nitrogen.	Fine.	Coarse.	Ton.
1914, Spring,	% 21.34	% 3.08	49.0	51.0	\$31.48
1914, Fall,	23.37	3.40	55.0	45.0	32.20
1915, Spring,	21.46	2.96	53.0	47.0	33.44
1915, Fall,	23.03	3.13	52.0	48.0	32.79
1916, Spring,	22.16	3.03	47.0	53.0	36.30

In a general way, jobbing prices of 20 and 18 cents a pound for nitrogen in fine and coarse bone, respectively, and 4 and 3 cents a pound for the phosphoric acid in these fractions according to fineness, would correspond to this season's jobbing prices for ground bone; the corresponding retail figures, when freight is \$2.00, would be, for nitrogen, 26½ and 24 cents, and for phosphoric acid, 5½ and 4 cents.

ORGANIZATION OF THE WORK.

The work of the season has been performed under my direction as follows:

The nitrogen determinations, total, by G. C. Given, Ph.D.; available, by A. B. Long, B. S.; the total phosphoric acid and moisture, by G. J. Kuhlman, B. S.; the insoluble phosphoric acid, by F. J. Holben, B. S.; and C. A. Kern; the potash and chlorin, by E. S. Erb, M. S.; the computations by M. Verna Bryce and others. Dr. G. C. Given had charge of the reception and preparation of samples, and immediate supervision of analytical work. To all these assistants the writer is indebted for loyal aid.

COMPLETE

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
1161	ALPHANO HUMUS CO., NEW YORK CITY. Prepared Alphano Humus,	L. A. Wheeler, Derry,	21.87
1104	AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK CITY.		
328	Complete Manure for Top Dressing, 1916, ..	John B. Buckman, Newtown,	7.87
833	Eagle Phosphate,	R. W. Daub, Muir,	8.76
1447	Odorless Grass and Lawn Top Dressing, ..	Weeks Hardware Co., Scranton, ...	8.47
114	Wheat, Corn and Grass Fertilizer,	John W. Buckman, .....	.31
74	Allen's Popular Phosphate, 1916,	H. W. Burg, Hellam,	9.57
769	Bradley's Complete Manure for Potatoes and Vegetables, 1916,	Shultz & Pardoe, Franklin,	5.08
499	Bradley's Eclipse Phosphate, 1916,	Skelton & Baker, Edinboro,	6.59
500	Bradley's Golden Eagle, 1916,	Edwin L. Myers, Gardenville,	7.89
609	Bradley's Half Century Fertilizer, 1916, ...	Edwir L. Myers, Gardenville,	9.34
381	†Bradley's New Method Fertilizer, 1916, ...	E. M. Putman, Columbus,	5.86
742	†Canton Chemical Baker's Special Wheat Corn and Grass Mixture, 1916,	R. S. Hardie, Mehoopany,	5.86
316	Canton Chemical Eagle Phosphate,	S. J. Saint, Sharpsburg,	3.53
1287	Canton Chemical Potato and Truck Manure, ..	M. L. Stultz & Son, Hollidaysburg, ..	7.36
1516	Canton Chemical Potato and Vegetable Manure, 1916,	B. S. Noll, Middletown, R. No. 1, ...	9.19
744	†Crocker's Complete Manure, 1916,	W. E. Winey, Middleburg,	6.38
614	†Crocker's General Crop Fertilizer,	Irwin Mengle, Barnesville,	6.38
1163	†Crocker's Harvest Jewel Fertilizer, 1916, ...	G. F. Mack, New Florence, R. No. 2, ..	3.96
76	Crocker's Potato, Hop and Tobacco Fer- tilizer, 1916,	J. M. Abbott, Sugargrove,	5.87
1197	†Crocker's Universal Grain Grower, 1916, ...	I. W. Gibson, Indiana,	7.31
1201	†Detrick's Corn and Oats Fertilizer,	John Greenleaf, Quarryville,	6.92
613	Detrick's Kangaroo Komplete Kompond, ..	I. W. Gibson, Indiana,	5.61
612	Detrick's Special Ammoniated Compound, ..	R. D. Everts, Warren,	6.46
1207	East India Corn King,	Engstrom & Peterson, Chandler Val- ley,	3.75
719	Great Eastern General, 1916,	C. H. Smith & Co., Sheffield,	3.43
1258	Great Eastern High Grade Potato Ferti- lizer, 1916,	Enos Barkey, Evans City,	7.44
719	Great Eastern Northern Corn Special, 1916, ..	A. M. Austin, Glen Rock, R. No. 2, ..	7.63
998	Lasaretto A. A. Crop Grower,	Enos Barkey, Evans City,	8.60
241	Michigan Carbon Works Red Line Complete Manure,	Somerset Milling Co., Somerset,	9.15
258	Milson's Potato and Cabbage Manure, 1916, ..	Theodore Gerhart, Gilberts,	9.06
620	†Milson's Wheat, Oats and Barley, 1916, ...	Julius Long, Danboro,	8.60
727	Moro Phillips Farmers' Potato Mixture, ..	Julius Long, Danboro,	9.15
1117	Moro Phillips Special Fertilizer, 1916,	Geo. Uffelman, Parke,	9.06
780	Moro Phillips Standard Guano, 1916,	Davis & Hyde, Spartansburg,	9.40
1286	North Western Complete Compound, 1916, ...	Will Russell, Lottsville,	6.03
1	†Packer's Union Universal Fertilizer, 1916, ...	A. O. McKissick, Euclid,	6.58
313	†Sharpless & Carpenter Fish Guano, 1916, ...	Isaac J. Tustin, Phoenixville,	9.51
692	Sharpless & Carpenter No. 1 Brand Phos- phate, 1916,	Nathan Huntzicker, New Ringgold, ...	10.62
196	†Sharpless & Carpenter No. 2 for Grass and Grain,	J. I. Goss, Painterville,	8.63
677		A. E. Baker, Ernigsville,	6.33
679		Monroe Savidge, Hegins, R. D., ...	7.51
		S. Peck & Son, Nittany,	8.23
		Hilles & Taggart, Norristown,	7.51
		J. Kunkle & Son, Orwigsburg,	8.23
		Hilles & Taggart, Norristown,	7.51
		Paxton Flour & Feed Co., Bowmans- dale,	7.51
		W. J. Leister, Cocolamus,	7.51

†Composite sample.

FERTILIZERS.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.						Selling price of 2,000 pounds at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive insoluble.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
83	.50	1.11	1.94	.....	.84	.....	.84	.50	.40	1.06	c1.07	2.12	1.25	20.00
9.19	8.00	.83	10.02	9.00	1.46	.....	1.46	1.00	2.47	3.42	a.43	*3.84	4.11	45.00
8.63	7.00	1.28	9.90	8.00	.98	.....	.98	1.00	.79	1.00	a.12	1.12	.82	30.00
8.71	8.00	.65	9.26	9.00	1.18	.....	1.18	1.00	2.94	8.60	a.34	8.04	3.70	42.00
10.04	9.00	1.34	11.38	10.00	1.38	.....	1.38	1.00	.72	1.01	a.17	1.15	.82	30.00
8.86	8.00	1.00	9.86	9.00	1.10	.....	1.10	1.00	.63	.73	b.17	.90	.83	23.00
10.17	9.00	.98	11.10	10.00	1.18	.....	1.18	1.00	2.74	3.17	a.15	3.32	3.29	42.00
11.36	10.00	1.22	12.58	11.00	1.16	.....	1.16	1.00	1.07	1.42	a.12	1.54	1.28	29.00
8.27	8.00	.83	9.09	9.00	1.33	.....	1.33	1.00	2.78	3.81	a.58	4.37	4.11	37.00
10.42	10.00	.89	11.31	11.00	1.08	.....	1.08	1.00	1.33	1.76	a.24	2.90	2.06	29.00
9.97	8.00	1.22	11.19	9.00	.73	.....	*.73	1.00	.57	.93	a.15	1.08	.82	37.00
10.84	9.00	1.39	11.23	10.00	.93	.....	.93	1.00	.74	.89	a.09	.83	.82	30.00
7.80	7.00	1.49	8.79	8.00	1.26	.....	1.26	1.00	.55	.71	b.15	.86	.83	24.00
9.65	9.00	.85	10.50	10.00	1.04	.....	1.04	1.00	-2.10	2.97	a.27	3.24	3.29	35.00
10.73	10.00	1.39	12.12	11.00	.90	.....	.90	1.00	.94	1.23	a.12	1.34	1.23	35.00
11.78	10.00	1.25	13.08	11.00	.53	.85	.88	1.00	.58	.76	a.11	.87	.83	28.00	
8.07	7.00	1.11	9.18	8.00	1.06	.....	1.06	1.00	.59	.83	a.12	.95	.82	25.50
10.75	9.00	.51	11.26	10.00	.98	.....	.93	1.00	1.39	1.77	a.11	1.38	1.65	34.00
11.60	10.00	.60	12.20	11.00	.85	.....	.86	1.00	1.49	1.88	a.10	1.58	2.06	34.00
9.88	8.00	1.60	11.48	9.00	.77	.....	*.77	1.00	.54	.88	a.12	1.00	.83	33.00
10.13	9.00	1.24	11.37	10.00	.86	.....	.86	1.00	.60	.81	a.09	.90	.83	26.00
12.34	10.00	.65	12.99	11.00	.61	.....	*.61	1.00	1.39	1.68	a.10	1.73	1.65	23.00
9.08	8.00	1.32	10.40	9.00	1.23	.....	1.23	1.00	.70	.84	b.11	.95	.83	24.00
11.01	9.00	.20	11.71	10.00	1.06	.....	1.06	1.00	1.35	2.05	a.35	2.40	2.47	30.00
8.06	8.00	.87	8.95	9.00	1.04	.....	1.04	1.00	.75	.97	a.12	1.09	.82	22.00
11.19	10.00	.83	12.07	11.00	.84	.....	.84	1.00	1.28	1.74	a.16	1.90	1.65	25.50
9.70	8.00	.89	10.59	9.00	.89	.....	.89	1.00	1.19	1.80	a.26	2.06	2.06	25.50
9.68	8.00	1.56	11.24	9.00	1.06	.....	1.06	1.00	1.24	1.58	a.18	1.72	1.65	25.50
9.43	8.00	2.09	11.53	9.00	1.12	.....	1.12	1.00	.48	.66	b.16	.82	.82	25.50
11.89	10.00	.80	12.69	11.00	.85	.....	.85	1.00	.54	.78	b.17	.95	.82	25.25
9.07	8.00	1.50	10.57	9.00	.63	.....	*.63	1.00	.46	.69	a.14	.73	.82	24.50
10.50	10.00	.93	12.43	11.00	1.13	.....	1.12	1.00	.73	1.13	a.13	1.36	1.23	33.00
10.06	8.00	.92	10.93	9.00	.96	.....	.96	1.00	1.20	1.69	a.28	1.97	2.06	28.00
11.61	10.00	1.10	12.71	11.00	1.22	.....	1.22	1.00	1.04	1.31	a.09	1.40	1.23	25.00
8.46	8.00	1.42	9.88	9.00	1.20	.....	1.20	1.00	.51	.69	b.22	.91	.82	20.32
8.93	8.00	1.00	9.93	9.00	1.04	.....	1.04	1.00	.69	.88	a.09	.97	.82	23.60
9.28	8.00	.80	10.08	9.00	.92	.....	.92	1.00	1.38	1.97	a.21	2.18	2.06	30.00
10.79	9.00	1.13	11.92	10.00	1.13	.....	1.13	1.00	1.16	1.74	a.25	1.99	1.65	29.00
8.70	7.00	1.47	10.17	8.00	1.33	.....	1.33	1.00	.68	.85	b.14	.99	.83	23.50
														22.00	

a, b, c. Characters indicating the proportion of insoluble nitrogen that is inactive: a=2/5 or less; b=2/5 to 3/5; c=3/5 or more.
 *Constituent falls below guaranty.

COMPLETE FERTI

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK CITY—Continued.			
1166	Sharpless & Carpenter, Potato, Corn and Truck Guano, 1916.	I. W. Gibson, Indiana,	8.71
199	{Sharpless & Carpenter Soluble Tampico}	Hilles & Taggart, Norristown,	8.29
783	{Guano, 1916.	J. Kunkle & Son, Orwigsburg,	
932	Susquehanna Ammoniated Phosphate, 1916.	Wm. Weaver, Freemansburg,	7.46
1458	Susquehanna Potato Phosphate, 1916.	H. P. Paasmore & Bro., Oxford,	6.94
933	Susquehanna Special Potato and Tobacco Manure, 1916.	Wm. Weaver, Freemansburg,	9.10
116	Tygart Allen's Star Brand Phosphate, 1916.	H. W. Burg, Hallam,	9.19
115	{Tygart Allen's Star Potato Grower, 1916.	H. W. Burg, Hallam,	9.23
275	{Tygart Allen's Standard Brand Phosphate, 1916.	Miller & Bushong, Rohrerstown,	
657	Williams & Clark's Americus Potato Manure, 1916.	Greenwald & Benograff, New Tripoli,	8.96
380	Williams & Clark's Elk Brand, 1916.	J. V. Taylor & Sons, Wyalusing, ..	2.13
955	Williams & Clark's Matchless Fertilizer, 1916.	F. H. Houseknecht, Seybertsville, ..	7.43
496	Williams & Clark's Special Prolific Crop Producer.	Jacob Rush, Plumsteadville,	7.07
956	Zell's Special Compound for Potatoes and Vegetables, 1916.	F. H. Houseknecht, Seybertsville, ..	7.83
1067		N. R. Snyder, Elizabethtown,	7.37
AMERICAN FERTILIZER CO., BALTIMORE, MD.			
70	Bob White Emergency Compound, Revised.	Mr. Carnagy, Vintage,	8.33
448	{American Fish and Bone Compound, Revised.	Muslemman Bros., New Holland, ...	8.33
850	{American Reliable Guano,	R. B. Hyson, Bridgeton,	
573		N. R. Yost, Myerstown,	7.79
27		J. M. Pfeiffer, Quarryville, R. No. 1,	
955		Burt Hoff, Spring Grove,	
ARMOUR FERTILIZER WORKS, BALTIMORE, MD.			
281	{Grain Grower,	H. S. Newcomer, Mt. Joy,	6.33
606	{Armours 4-8-2,	R. J. Helenbrook, Custer City,	
204		C. E. Price, Huntingdon Valley, ..	6.33
278		H. S. Newcomer, Mt. Joy,	
205		C. E. Price, Huntingdon Valley, ..	4.96
95	{Armour's 3-8-1,	United Hdw. & Supply Co., Titusville, ..	
355		D. G. Stuft, Stoyestown,	6.33
444		S. H. Snively, Manheim,	
11	{Armour's 2-8-1,	W. S. Buckman, Hathboro,	4.71
538		M. L. Bachman, Lebanon,	
206		C. E. Price, Huntingdon Valley, ..	4.71
94	{Wheat, Corn and Oats Special, 1-7-1,	United Hdw. & Supply Co., Titusville, ..	
303		A. P. Lippey, Littlestown,	
R. S. AUCKER, SHAMOKIN, PA.			
1013	Economy Phosphate,	Chas. S. Hendricks, Sellinsgrove, ..	8.44
1041	Grade B. Bone and Slaughter House Phosphate.	Chas. S. Hendricks, Sellinsgrove, ..	7.65
1042	Grade D. Phosphate,	Chas. S. Hendricks, Sellinsgrove, ..	4.49
BAUGH & SONS CO., PHILADELPHIA, PA.			
522	{Baugh's Animal Base and Potash Compound for all crops.	J. C. Emery & Co., Nottingham, ..	7.79
1347		J. A. Umble & Bro., Bird-in-Hand, ..	
625		E. H. Keen & Co., Parkesburg, ...	5.83
108	{Baugh's Ammoniated Soluble Alkaline, ...	Milton Welmon, Dover,	
726		O. W. Luck, Zelenople,	

†Composite sample.

LIZERS—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.					Selling price of 2,000 pounds at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive Insoluble.	Total.		
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.	
11.72	10.00	.89	12.61	11.00	.93	.....	.93	1.00	.90	1.28	a.11	1.39	1.23	28.80
10.13	9.00	.83	10.96	10.00	1.14	.....	1.14	1.00	2.02	2.72	a.23	*2.95	3.29	35.00
10.62	9.00	1.01	11.63	10.00	.87	.....	.87	1.00	1.33	1.85	a.14	1.96	1.65	26.00
9.43	8.00	1.13	10.76	9.00	1.34	.....	1.34	1.00	1.58	2.01	a.14	2.15	2.06	30.00
10.51	9.00	.92	11.43	10.00	1.32	.....	1.32	1.00	1.04	1.51	a.27	1.73	1.65	24.00
8.62	8.00	1.71	10.33	9.00	1.10	.....	1.10	1.60	1.61	2.00	a.23	2.22	2.06	28.00
11.69	10.00	.89	12.53	11.00	.84	.....	.84	1.00	.92	1.28	a.12	1.40	1.23	26.00
10.72	9.00	1.01	11.73	10.00	.53	.73	1.26	1.00	1.11	1.61	a.19	1.80	1.65	25.50
11.29	8.00	.89	12.13	9.00	1.43	.....	1.43	1.00	1.10	1.79	a.32	2.11	2.06	31.00
10.70	10.00	1.34	12.04	11.00	1.06	.....	1.06	1.00	.48	.83	a.22	1.05	.82	24.75
10.79	9.00	1.11	11.90	10.00	1.18	.....	1.18	1.00	1.23	1.72	a.24	1.96	1.65	26.25
8.70	8.00	1.18	9.88	9.00	1.02	.....	1.02	1.00	.35	.65	b.23	.84	.82	23.00
11.01	9.00	.92	11.93	10.00	1.02	.....	1.02	1.00	.99	1.43	a.19	*1.56	2.47	.....
9.49	9.00	1.78	11.27	10.00	1.28	.....	1.28	1.00	1.02	1.21	b.24	1.45	1.23	24.75
9.73	8.50	1.25	10.98	9.50	.97	.....	.97	1.00	1.04	1.47	a.19	1.66	1.65	27.00
8.52	8.00	1.99	10.51	9.00	1.92	.....	1.92	1.00	.55	.66	c.24	.80	.82	25.00
8.26	8.00	1.28	9.54	8.50	2.30	.....	2.30	2.00	.73	1.12	b.47	1.59	1.65	34.00
8.61	8.00	.68	9.29	8.50	2.20	.....	2.20	2.00	2.22	2.78	b.43	3.21	3.29	35.00
8.76	8.00	.47	9.23	8.50	.96	.....	.96	1.00	1.69	2.10	b.33	2.46	2.47	40.00
8.18	8.00	1.29	9.47	8.50	1.36	.....	1.36	1.00	.59	1.16	b.53	1.69	1.65	40.00
7.23	7.00	.50	7.72	7.50	1.02	.....	1.02	1.00	.44	.62	b.19	.81	.82	31.00
*9.30	10.00	1.30	10.60	.....	.52	.....	.52	.25	.29	.....	.....	.42	.21	24.00
8.87	8.00	2.73	11.60	.....	.83	.....	.83	.50	.66	1.03	a.22	1.25	1.02	27.00
8.70	7.00	2.11	10.81	.....	.46	.....	.46	.25	.31	.53	b.15	.65	.41	27.00
9.86	9.00	2.14	12.00	.....	.93	.....	.93	1.00	1.02	1.42	b.32	1.74	1.65	27.00
*7.73	8.00	1.56	9.29	.....	.74	.....	.74	.50	.38	.50	b.14	.61	.41	27.00
														19.50
														24.00

a, b, c. Characters indicating the proportion of insoluble nitrogen that is inactive: a=2/5 or more; b=2/5 to 3/5; c=3/5 or less.

*Constituent falls below guaranty.

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Mixture in 100 pounds.
BAUGH & SONS CO., PHILADELPHIA, PA., Continued.			
233 179 877 524 263 682 1550 302 687 670 233 532 531 617	{Baugh's Complete Animal Base Fertilizer, Big "Potato" Brand. Baugh's Excelsior Guano, Baugh's Grand Rapid High Grade Guano, Baugh's Peruvian Guano, Substitute for Potatoes and all Vegetables. Baugh's Potato and Truck Special for all truck crops. Baugh's Special Potato Manure,	H. A. Smith, Leighton, J. Watson Craft, Ambler, B. & J. T. Copey, Scranton, E. H. Keen & Co., Parkersburg, .. N. H. Blough, Davidsville, J. G. Brubaker, Richfield, Nathan Shaffer, Luthersburg, W. E. Erwin, Somerton, S. K. Mohr, Coopersburg, S. K. Mohr, Coopersburg, Henry Wurts & Son, Washington- boro, W. H. Tuglesonger, Shippensburg, .. J. C. Emery, Nottingham, John Phelps, Sugar Grove,	7 1/2 5 1/2 4 1/2 6 1/2 7 1/2 6 1/2
212	THE BERG CO., PHILADELPHIA, PA. New Standard Bone Manure,	Harry M. Myers, Doylestown,	1 1/2
1336 913 1063 613 715 1227	BOWKER FERTILIZER CO., NEW YORK CITY. Bowker's All 'Round Fertilizer, 1916, Bowker's Potato Phosphate, 1916, Bowker's Staple Phosphate, 1916, Stockbridge's General Crop Manure, 1916, ..	F. A. Shelauder & Son, Marrindale, .. H. L. Stultz & Bro., Altoona, Harvey L. Moses, Chester Springs, .. C. H. Sanders, Sugargrove, Mars Mfg. & Feed Co., Mars, J. A. Stoll & Co., Kane,	7 1/2 5 1/2 1 1/2 1 1/2
814	THOMAS FERTILIZER WORKS, CENTRAL CHEMICAL CO., HAGERSTOWN, MD. C. C. C. Phoenix,	Ross Snyder, Friedens, R. No. 2, ..	4 1/2
1579	CHESAPEAKE CHEMICAL CO., BALTI- MORE, MD. C. C. Co's. Dissolved Guano,	L. R. Owen, Curryville,	2 1/2
248 817 536 169 973 121 770 121 971	COE MORTIMER CO., NEW YORK. {E. Frank Coe's Corn King, 1916, {E. Frank Coe's Gold Brand Excelsior Guano, 1916, E. Frank Coe's Morco Top Dresser, 1916, .. {E. Frank Coe's New Englander Special, 1916,	Vineyard Supply Co., North East, .. Adolf Boettinger, Danville, I. W. Scott & Co., Pittsburgh, Adolf Boettinger, Danville, E. A. Bertholomew, Saylorsburg, .. Chas. Schoffstall, Valley View, F. F. Harrison, Edinboro, Chas. Schoffstall, Valley View, E. A. Bertholomew, Saylorsburg, R. No. 1,	6 1/2 6 1/2 7 1/2 7 1/2
482 793 483 396	COLUMBIA GUANO CO., BALTIMORE, MD. Columbia Growmore Compound, {Columbia Wheat, Corn and Grass Special Fertilizer,	John Cook, Buckingham, C. H. Schmucker, Friedens, John Cook, Buckingham, Wm. F. Miller, Lamar,	5 1/2 6 1/2
1499 449 870	CONSUMERS CHEMICAL CORPORATION, NEW YORK CITY. Consumers Pure Sure Plant Food, {Consumers Pure Sure Potato and Vege- table with 2% Potash.	Murry & Co., Honesdale, Eli Martin, New Holland, Lester Tompson, Clarks Summit, ..	5 1/2 5 1/2
206 207 206	JAS. G. DOWNWARD CO., COATESVILLE, PA. Ammoniated Phosphate, 1916 Pioneer Potato Manure, Potato, Corn and Grain Special,	Isaac Tomlinson, Huntingdon Valley, .. Isaac Tomlinson, Huntingdon Valley, .. Isaac Tomlinson, Huntingdon Valley, ..	5 1/2 5 1/2 5 1/2

†Composite sample.

LIZERS—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.						Selling price of 2,000 pounds at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive insoluble.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
11.17	10.00	1.43	12.60	.....	1.06	.....	1.06	1.00	1.00	1.41	b.32	1.73	1.65	25.50
10.55	10.00	2.01	12.56	.....	1.32	.....	1.32	1.00	.95	1.17	b.24	1.41	1.02	23.50
9.06	9.00	1.15	10.21	.....	1.00	.....	1.00	1.00	2.19	2.56	b.33	2.89	2.47	24.00
9.78	8.00	.92	10.70	.....	.53	.63	1.16	1.00	2.27	2.71	b.38	*2.00	2.30	25.00
9.55	8.00	.89	10.44	.....	1.12	.....	1.12	1.00	2.57	2.94	b.40	*3.24	4.12	24.00
10.30	10.00	1.50	12.39	.....	1.07	.46	1.53	1.00	1.77	2.20	b.49	*2.63	2.88	40.00
9.32	10.00	2.21	12.04	.....	.93	.....	.93	1.00	.84	1.15	b.45	1.60	1.65	30.00
10.05	9.00	2.22	12.28	11.00	1.69	.....	1.69	1.25	1.58	2.14	b.54	*2.67	3.00	.....
11.65	10.00	.61	12.17	11.00	1.18	.....	1.18	1.00	1.58	1.96	a.08	2.02	2.06	29.50
11.24	10.00	1.24	12.53	11.00	.93	.....	.93	1.00	1.24	1.61	a.14	1.75	1.65	30.00
9.19	8.00	1.45	10.64	9.00	.80	.....	*.80	1.00	.39	.64	b.18	.82	.82	27.50
10.39	9.00	.34	11.22	10.00	1.12	.....	1.12	1.00	2.77	3.18	a.10	3.29	3.29	27.00
8.61	8.00	.50	9.11	.....	.90	.....	.90	.50	.48	.....	.....	.69	.41	18.00
8.94	7.00	1.70	10.65	7.50	.34	.....	.34	.25	.32	.50	c.47	1.00	.82	19.50
11.25	10.00	1.15	12.40	11.00	1.24	.....	1.24	1.00	2.51	2.86	a.10	2.96	2.06	30.00
10.24	9.00	1.08	11.22	10.00	.90	.....	.90	1.00	2.00	2.52	a.12	2.64	2.47	31.00
6.61	5.00	.60	7.21	6.00	1.49	.....	1.49	1.60	5.50	6.45	a.22	*7.77	9.28	33.00
8.24	6.00	1.12	9.94	9.00	.93	.....	.93	1.00	.62	.85	a.13	.97	.82	29.50
8.10	8.00	1.31	9.41	8.50	1.32	.....	1.32	1.00	.93	1.29	b.48	1.77	1.65	50.55
5.40	8.00	.91	9.31	8.50	1.10	.....	1.10	1.00	.60	.85	b.18	1.01	.82	25.50
9.32	8.00	.66	9.98	9.00	.53	.91	1.44	1.00	.54	.82	a.09	.91	.82	22.80	
10.15	8.00	1.42	11.58	9.00	.92	1.47	2.40	2.00	2.34	2.64	b.69	3.32	3.29	24.00	
*7.70	8.00	.85	*8.55	9.00	.64	.....	.66	.50	.39	.72	b.32	1.04	.41	34.00
*7.47	8.00	.93	*8.40	9.00	1.25	.....	1.25	1.60	2.01	2.41	b.35	2.76	2.47	24.00
*7.47	8.00	1.16	*8.63	9.00	1.23	.....	1.23	1.00	1.27	1.46	a.08	1.64	1.65	29.00

a, b, c. Characters indicating the proportions of insoluble nitrogen that is inactive: a=2/5 or more; b=3/5 to 3/5; c=3/5 or less.

*Constituent falls below guaranty.

COMPLETE FERTI

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
216	DUNGAN FERTILIZER CO., DOYLESTOWN, PA. Potato Manure,	Dungan Fert. Co., Doylestown,	11.63
252	ERIE REDUCTION CO., ERIE, PA. General Crop Special,	W. D. Ripley, Wesleysville,	5.06
586 10 685	EUREKA CHEMICAL CO., BALTIMORE, MD. †Eureka Fish and Potash,	John Tallor, Shippensburg, E. H. Frick, York, R. No. 8, A. P. Dumms, Thompseontown,	4.41
274 1283 440	FARMERS' FERTILIZER WORKS, ELIZABETHTOWN, PA. †High Grade,	H. M. Baer & Son, Salunga, Addison Landis, Middletown, H. H. Martin, Manheim,	9.37 10.92
6 4	W. S. FARMER & CO. (AM. AG. CHEM. CO., NEW YORK). W. S. Farmer & Co. Branch Clyde Brand, 1916. W. S. Farmer & Co. Branch Pelican Guano, 1916.	E. A. Bear, York, R. No. 8, E. A. Bear, York, R. No. 8,	3.27 3.06
190	GRIFFITH & BOYD CO., BALTIMORE, MD. Farmers' Potato and Tomato,	S. H. Chambers & Bro., Elkview, ...	10.66
757 472 466 225 585 961 775 551 952 776 1037	S. M. HESS & BRO., PHILADELPHIA, PA. Big Crop Fertilizer, 1916, Farmers' General Fertilizer, 1916, †Keystone Phosphate, Potato Manure, 1916, †Special Corn Manure, 1916, †Wheat and Grass Manure, 1916,	Alfred Fritzingler, Sittlers, C. W. Book, Mexico, Wm. Peffenberger, Mifflinburg, Mosca Weaver, Johnstown, R. No. 4, ... H. M. Hostetter, Campbelltown, Edwin Wagner, Hellertown, A. L. Velt, McKean, H. M. Hostetter, Campbelltown, Chas. Tressler, Conyngham, A. L. Velt, McKean, W. F. Hafer, New Columbia,	7.47 10.41 8.17 7.73 3.58 5.81
493 494	P. HOFFMAN & BRO., RAUBSVILLE, PA. Hoffman's Grain and Corn, Hoffman's Potato and Truck,	P. Hoffman & Bro., Raubsville, P. Hoffman & Bro., Raubsville,	3.53 3.39
358 134 844 991 1414	HUBBARD FERTILIZER CO., BALTIMORE, MD. †Hubbard's Columbia Phosphate, †Hubbard's Farmers' Phosphate,	C. H. Schmucker, Friedens, Wm. Schadle, Pillow, R. D., J. Emery Mone, Iron Ore, J. C. Lieb & Co., Stewartstown, Hartley & Blaine, Turbotville,	3.96 5.95
1072 1241 1073 1242 301 1243	M. P. HUBBARD & CO., BALTIMORE, MD. †Hubbard's Big Jim Compound, †Hubbard's Domino Compound, †Hubbard's Good and Cheap,	P. W. G. Baker, Elizabethtown, .. F. E. Neffe & Co., Coudersport, ... P. W. G. Baker, Elizabethtown, F. E. Neffe & Co., Coudersport, M. J. Sheffer, Hanover, F. E. Neffe & Co., Coudersport, ...	5.07 3.89 7.70
352 1340	INTERNATIONAL AGRICULTURAL CORPORATION, BUFFALO FERTZ. WKS., BUFFALO, N. Y. Buffalo Garbage Tankage, Buffalo High Grade Manure,	Edward Fracler, Shanksville, Victor Lantz, Mt. Jewett,	5.33 6.65

†Composite sample.

LIZERS—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.					Selling price of 2,000 pounds at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate. *	Total.		Water soluble.	Available.	Inactive insoluble.	Total.		
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.	
8.37	7.00	2.96	11.27	9.00	1.16	.....	1.16	1.00	1.15	1.68	a.30	1.96	2.07	24.00
8.25	7.00	1.09	9.29	9.00	1.23	.....	1.23	1.00	.29	.69	b.59	1.29	1.23	24.70
8.50	8.00	.54	9.04	8.50	.55	.....	.55	.25	.32	.46	b.17	.63	.41	18.00 19.50
9.33	8.00	.93	10.76	9.00	1.96	.....	1.96	1.00	2.08	2.56	b.64	3.26	3.28	32.00 32.00 24.00
8.46	7.00	1.11	9.57	8.00	1.97	.....	1.97	1.00	1.23	1.73	b.70	2.47	2.47	24.00
9.30	8.00	1.24	10.54	9.00	1.02	.....	1.02	1.00	.64	.84	b.17	1.01	.82	22.50
8.07	8.00	1.49	9.50	9.00	1.10	.....	1.10	1.00	.53	.....	.....	.66	.41	20.20
9.50	8.00	1.49	10.99	9.00	1.32	.....	1.32	1.00	.37	.72	b.40	1.12	1.25	28.00
11.52	10.00	1.05	12.57	11.00	.82	.....	.82	1.00	.93	1.42	a.21	1.63	1.65	30.50
11.09	10.00	1.21	12.30	11.00	.94	.....	.94	1.00	.55	.70	b.14	.84	.82	.....
8.66	8.00	1.28	9.94	9.00	1.08	.....	1.08	1.00	.73	.93	a.08	1.01	.82	28.50
10.14	9.00	1.00	11.14	10.00	1.10	.....	1.10	1.00	1.56	2.20	a.22	2.42	2.47	28.00
10.40	9.00	1.31	11.71	10.00	.88	.....	.88	1.00	.55	.90	a.10	1.00	.82	26.00
10.86	9.00	1.49	12.34	10.00	.96	.....	.96	1.00	.59	.83	a.14	.97	.82	28.00 26.00 28.75
9.91	7.00	3.06	12.97	10.00	.93	.....	.93	1.00	.45	.77	b.30	1.07	.82	24.00
8.70	7.00	4.31	13.01	10.00	.96	.....	.96	1.00	.77	1.01	b.23	1.24	.82	28.00
9.22	8.00	1.73	10.96	8.75	.70	.....	.70	.50	.48	.82	b.24	1.00	.82	22.00 21.00 21.00
8.60	7.00	.94	9.54	7.50	.30	.....	.30	.25	.27	.50	c.49	.99	.82	17.50 20.50
8.91	8.00	.71	9.62	9.50	1.36	.....	1.36	1.00	.22	.32	c.25	.57	.41	22.00 26.50
9.48	8.00	.57	10.05	9.50	1.52	.....	1.52	1.00	.71	1.14	b.57	1.71	1.65	27.00 31.50
9.16	8.00	.66	9.82	9.50	1.37	.....	1.32	1.00	.61	.86	b.30	1.16	.82	24.50 28.50
8.97	8.00	.56	9.32	4.00	1.48	.....	1.48	.75	.59	1.19	c.1.40	2.56	2.30	19.00
			9.53		1.04	.....	1.04	1.00	2.26	3.29	a.62	3.91	3.30	36.25

a, b, c. Characters indicating the proportions of insoluble nitrogen that is inactive: a=2/5 or more; b=2/5 to 3/5; c=3/5 or less.

*Constituent falls below guaranty.

COMPLETE FERTI

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
57	JARECKI CHEMICAL CO., SANDUSKY, O.		
1128	{Lake Erie Guano with Phosphate and {	Clark Bros., Oil City,	9.90
781	Potash,	S. S. Mosholder, Rockwood,	
1128	Little Giant,	Chas. C. Good Co., North Girard, ..	2.54
	Number One Formula,	S. S. Mosholder, Rockwood,	8.22
	KEYSTONE BONE FERTILIZER CO., PHILA- DELPHIA, PA.		
394	1916 Keystone Corn and Cereal Grower, ..	Kemerer Hdw. Co., Leighton,	9.90
1086	1916 Keystone General Manure,	Wm. M. Harbert, Warrington,	12.40
1289	1916 Keystone High Grade Truck Guano, ..	R. J. Walton, Hummelstown,	8.12
	KEYSTONE GRANGE EXCHANGE, MANS- FIELD, PA.		
325	Grangers' Best Mixture,	I. E. Artz, Sec., Hegins Grange, ..	10.41
340	Grangers' Special Crop Grower,	J. A. Blough, Hollsopple, R. No. 1, ..	7.40
	KOLLER FERTILIZER CO., SEITZLAND, PA.		
103	Koller's Ammoniated Phosphate,	J. W. Sheffer, Red Lion, R. No. 2, ..	10.00
102	Koller's Electric,	J. W. Sheffer, Red Lion, R. No. 2, ..	12.30
100	Koller's Potato Grower Phosphate,	J. W. Sheffer, Red Lion, R. No. 2, ..	10.01
	LANCASTER BONE FERTILIZER CO., LAN- CASTER, PA.		
282	Connecticut Tobacco Wrapper Grower,	Henry Wertz & Son, Washingtonboro, ..	6.35
105	Potato, Fruit and Vegetable,	Josiah Flinchbaugh, Winsou,	3.55
919	Potato, Tobacco and Truck Manure,	Ira Bechtel, Roaring Springs,	5.40
	LANCASTER CHEMICAL CO., LANCASTER, PA.		
1575	No. 1 Tobacco and Vegetable,	D. W. Williams, Willow Street, ..	6.35
653	No. 2, Dewey Brand,	Chas. Harting, Lynnport,	7.32
667	{No. 19 Potato Special,	J. L. Royer, Myerstown,	
446		E. B. Ruhl & Son, Manheim,	8.22
654		Juhn Kunts, Lynnport,	
	LEBANON FERTILIZER WORKS, LEBANON, PA.		
1240	Levan's Potato and Tobacco Fertilizer, ..	Mr. Fisher, Yellow House,	6.53
753	{Levans Special Corn Fertilizer,	C. F. Snyder, Tamaqua,	4.64
1276		W. A. Bailets, Dauphin,	
	LISTER'S AGRICULTURAL CHEMICAL WORKS, NEWARK, N. J.		
294	{Lister's Corn and Potato Fertilizer, 1916, {	J. C. Ernst & Co., York,	6.48
186		W. E. Erwin, Somerton,	
455	Lister's Pennsylvania Special, 1916,	L. D. Brackbill, Kinser,	9.28
1411	Lister's Potato and Corn No. 2 Fertilizer, ..	Benj. Savidge, Turbotville,	10.27
788	1916,	J. R. Hanks, Springboro,	
187	Lister's Potato Manure, 1916,	W. E. Erwin, Somerton,	11.08
428	{Lister's Special Crop Producer, 1916, ... {	Jacob Bouser, St. Clairville,	7.75
291		J. C. Ernst & Co., York,	
1005	Lister's Special Tobacco Fertilizer, 1916, ..	Wm. F. Fritz, Berwyn,	8.60
570		Ell Witmer, Lampeter,	
709	{Lister's Success Fertilizer, 1916,	Morrow & Buxton, Valencia,	10.07
464		L. D. Brackbill, Kinser,	
786	{Lister's U. S. Super Phosphate, 1916, ... {	J. R. Hanks, Springboro,	6.74
1094		Wm. Fritz, Berwyn,	
1412	Lister's Valley Brand Fertilizer, 1916,	Benj. Savidge, Turbotville,	9.06
1430		J. T. Murphy, Clearfield,	

†Composite sample.

FIZERS—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.				Nitrogen in 100 Pounds.					Selling price of 2,000 pounds at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive insoluble.	Total.		
Found.	Guarantee.		Found.	Guarantee.			Found.	Guarantee.				Found.	Guarantee.	
9.87	9.00	1.19	10.76	10.00	.80	.44	1.24	1.00	.69	1.08	b.25	1.25	1.25	29.40
7.65	7.00	.84	8.39	8.00	1.04	.....	1.04	1.00	.56	.84	a.18	1.02	.83	24.75
9.25	9.00	1.25	10.70	10.00	.69	.....	.69	1.00	.48	.63	c.24	.85	.39	24.00
8.26	8.00	1.20	9.46	9.00	2.30	.....	2.30	2.00	.88	1.81	b.50	1.81	1.65	32.00
9.53	8.00	.83	10.41	9.00	1.82	.....	1.82	1.00	.92	1.16	b.38	1.54	1.23	28.00
8.90	.....	1.12	10.09	.....	.37	.....	.37	.....	2.93	3.81	a.29	4.20	.....	.....
8.83	8.00	1.46	10.29	9.00	2.46	.....	2.46	2.00	1.39	1.53	c.23	1.75	1.65	30.00
8.90	9.00	2.22	11.12	10.00	1.20	.....	1.20	1.00	.53	.68	c.28	.94	.82	24.00
9.53	8.00	.89	10.43	9.00	1.08	.....	1.08	1.00	.39	.52	b.27	.79	.82	20.00
10.46	9.00	.70	11.16	10.00	1.00	.....	1.00	.50	.15	.21	c.20	.41	.42	16.75
8.54	7.00	.47	9.01	8.00	1.75	.....	1.75	1.50	.52	.89	b.35	1.12	.83	23.00
8.34	8.00	.29	*8.63	9.00	.67	1.77	*2.74	3.00	.85	1.12	c.45	1.57	1.60	44.00
*6.39	7.00	1.67	8.05	8.00	1.24	.....	1.24	1.00	.47	.86	b.43	1.29	.82	.....
7.92	8.00	1.52	9.45	9.00	1.63	.....	1.63	1.00	.88	1.22	b.40	1.60	1.60	28.00
*6.61	7.50	1.20	*7.91	8.50	2.48	.....	2.48	1.00	.51	1.48	b.56	2.01	2.06	.....
8.76	8.00	.86	9.63	9.00	1.08	.....	1.08	1.00	.67	1.02	a.20	1.21	1.23	29.00
9.82	9.00	1.36	11.18	10.00	.53	.40	1.02	1.00	.91	1.32	a.10	1.51	1.65	27.00
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	26.00
*9.71	10.00	1.85	11.06	11.00	1.44	.....	1.44	1.00	1.49	1.83	b.31	2.19	1.64	.....
8.17	8.00	.98	9.15	9.00	2.20	.....	2.20	2.00	.56	.77	b.34	1.11	.89	29.00
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32.40
9.05	8.00	1.17	10.22	9.00	1.08	.....	1.08	1.00	1.32	2.25	a.07	2.32	2.09	33.00
9.99	9.00	1.28	11.37	10.00	1.24	.....	1.24	1.00	.73	.86	a.07	.93	.83	30.00
10.80	10.00	2.03	12.83	11.00	.98	.....	.98	1.00	2.25	3.71	a.23	2.99	2.06	27.00
8.75	8.00	.89	9.64	9.00	1.07	.37	1.44	1.00	2.39	3.66	a.54	4.20	4.11	24.00
8.86	8.00	1.08	9.74	9.00	1.18	.....	1.18	1.00	.60	.78	b.14	.93	.82	23.00
11.05	10.00	.99	12.56	11.00	.71	.....	*.71	1.00	1.37	3.06	a.22	3.31	2.06	23.00
11.78	10.00	.86	13.66	11.00	.90	.....	.90	1.00	.87	1.14	a.07	1.21	1.23	23.00
11.59	10.00	1.03	12.62	11.00	1.00	.....	1.00	1.00	.82	1.11	a.12	1.22	1.22	25.00
11.24	10.00	1.73	13.97	11.00	1.06	.....	1.06	1.00	.69	.86	a.07	.93	.82	37.50
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25.75
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28.00

a, b, c. Characters indicating the proportions of insoluble nitrogen that is inactive: a—2/3 or more; b—2/5 to 2/3; c—2/5 or more.

*Constituent falls below guaranty.

COMPLETE FERTI

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
MAPES FORMULA & PERUVIAN GUANO			
	CO., NEW YORK.		
433	Mapes' Corn Manure, War Brand,	W. H. Muth & Co., Lititz,	9.56
485	Mapes' General Special, War Brand,	Jos. K. Shultz, Washingtonboro, ...	6.33
256	Mapes' Potato Manure, War Brand,	Jos. K. Shultz, Washingtonboro, ...	6.37
284	Mapes' Tobacco Starter, Improved,	Jos. K. Shultz, Washingtonboro, ...	6.29
287	Mapes' Tobacco Manure, War Brand,	Jos. K. Shultz, Washingtonboro, ...	7.74
767	Mapes' Top Dresser, Full Strength, War Brand.	A. F. Kemmel, Orwigsburg,	5.96
MARTIN FERTILIZER CO., PHILADELPHIA, PA.			
192	}†Martin's Bull Head Fertilizer,	S. K. Chambers & Bro., Elkview, ..	6.13
639		Edwin Houck, Bangor,	
1294	Martin's Early Truck & Vegetable Grower.	Lebanon Hdw. Co., Lebanon,	8.06
MILLER FERTILIZER CO., BALTIMORE, MD.			
530	}†Club Brand,	C. C. Offer, Carlisle,	
806		Humbert & Krug, Littlestown,	4.30
822		Jos. A. Gass, Sunbury,	
289	Potato and Vegetable Grower,	Eli Witmer, Lampeter,	7.29
NASSAU FERTILIZER CO., NEW YORK.			
940	Nassau Special, 1916,	Lewis Hunte, Dallas,	9.40
950	}†Wheat and Grass Grower, 1916,	Philip Miller, Nescopeck,	9.48
577		Harry Stoffet, Sciota,	
NITRATE AGENCIES CO., NEW YORK.			
865	}†High Grade Genuine Peruvian Guano, ...	H. G. Leighton, Tunkhannock,	
62		B. H. Buckwalter, West Willow, ..	17.49
994		J. C. Lieb & Co., Stewartstown, ..	
G. OBER & SONS CO., BALTIMORE, MD.			
986	Obers Red King Guano,	Summit Lumber Co., New Freedom, ..	7.30
PATAPSCO GUANO CO., BALTIMORE, MD.			
16	}†Coon Brand Guano, 1916,	J. M. Flinchbaugh, Windsor,	8.59
416		Francis Baker, Everett,	
881	Patapasco Columbian Guano for Truck, Potatoes, Tobacco, 1916.	Weeks Hdw. Co., Scranton,	8.06
576	Patapasco Corn and Tomato Fertilizer, 1916.	Jos. Burkholder, Hummelstown, ...	10.41
927	Patapasco Money Maker, 1916,	F. P. Waite Co., Tyrone,	8.77
827	Patapasco Special Early Truckee, 1916,	W. H. Diehl, Northumberland, B. No. 1.	6.51
1269	Patapasco Special Potato Manure, 1916,	A. R. Whitenoyer, Unityville,	7.38
J. D. PERKINS, COATESVILLE, PA.			
509	Perkins' Special Bono Manure,	Jerome Tingley, Coatesville,	9.07
PITTSBURGH PROVISION & PACKING CO., PITTSBURGH, PA.			
248	}†Pure Bone with Potash,	J. Z. Rhoads Club, Agt., Stoystown, R. No. 1.	
739		Geo. Kenton & Co., Castle Shannon, ..	6.72
POLLOCK FERTILIZER CO., BALTIMORE, MD.			
22	}†The Pollock Fertilizer Co. Corn and Oats Special, 1916.	S. A. Barshinger, Red Lion,	7.19
415		Francis Baker, Everett,	
118	}†The Pollock Fertilizer Co. Corn, Wheat and Tomato Guano, 1916.	J. W. Gable, Hellam,	8.27
1259		H. M. Owens & Son, Lewistown, ...	
23	The Pollock Fertilizer Co. Special Potato and Tobacco Fertilizer, 1916.	S. A. Barshinger, Red Lion,	7.21

†Composite sample.

LIZERS—Continued

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.					Nitrogen in 100 Pounds.					Selling price of 2,000 pounds at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive insoluble.	Total.			
Found.	Guarantee.		Found.	Guarantee.			Found.	Guarantee.				Found.	Guarantee.		
10.37	8.00	1.60	11.97	10.00	1.50	.....	1.50	1.00	1.66	2.16	b.53	2.68	2.47	34.00
7.89	6.00	1.20	9.09	8.00	.67	1.10	1.77	1.00	5.03	5.53	b.58	6.11	5.76	46.00	
9.30	8.00	.98	10.28	10.00	.53	.65	1.18	1.00	3.30	3.63	b.41	4.04	3.71	42.00	
6.52	6.00	2.68	9.20	8.00	.67	.83	1.50	1.00	2.65	3.66	b.97	4.63	4.12	40.00	
7.50	5.00	1.36	8.85	8.00	1.07	.52	1.59	1.00	5.28	7.21	a.1.09	8.30	8.23	56.00	
7.27	5.00	.99	8.20	8.00	1.33	.22	1.55	1.00	9.37	9.61	a.17	9.76	9.87	60.00	
9.41	8.00	1.58	10.99	.....	.70	.....	.70	1.00	2.09	2.57	a.29	2.86	2.47	23.00
8.88	9.00	1.38	10.26	.....	1.62	.....	1.62	1.00	2.50	2.87	b.31	3.18	3.30	36.00
8.58	8.00	.29	8.87	8.50	.74	.....	.74	.50	.25	.36	c.23	.59	.41	19.50
8.73	8.00	.92	9.65	8.50	1.06	.....	1.06	1.00	.99	1.36	b.37	1.72	1.65	23.00
10.17	9.00	.75	10.92	10.00	.67	.79	1.46	1.00	1.96	2.41	b.30	2.71	2.67	32.25	
9.35	8.00	1.18	10.53	9.00	.90	.....	.90	1.00	.77	.94	a.12	1.06	.89	.....
11.56	11.00	.87	11.93	.....	2.76	.....	2.76	2.50	3.97	6.35	c.4.16	10.51	10.69	75.00
8.62	8.00	1.62	10.24	9.00	.67	.97	1.64	1.00	1.86	2.41	b.49	2.90	2.47	38.00	
9.63	9.00	1.31	10.94	10.00	1.12	.....	1.12	1.00	.66	.83	b.14	.97	.82	28.50
11.12	9.00	.64	11.76	10.00	1.06	.....	1.06	1.00	1.61	2.12	a.26	2.35	2.47	36.00
11.58	10.00	.89	12.47	11.00	1.06	.....	1.06	1.00	.85	1.09	a.10	1.19	1.23	26.00
9.20	8.00	1.24	10.44	9.00	1.04	.....	1.04	1.00	.69	.84	a.08	.92	.82	23.50
8.83	8.00	.56	9.38	9.00	2.18	.....	2.18	1.00	2.67	3.25	a.30	3.55	4.11	38.00
10.50	10.00	1.29	11.79	11.00	1.46	.....	1.46	1.00	1.23	1.78	a.17	1.93	1.66	28.75
7.98	8.00	1.34	9.32	.....	1.16	.....	1.16	1.00	.61	.83	b.16	.99	.87	26.00
11.60	7.00	4.42	16.02	14.00	1.75	.....	1.75	.50	.56	1.53	b.83	2.36	2.46	32.60
8.70	8.00	1.20	9.90	9.00	1.38	.....	1.38	1.00	.49	.....	.....	.64	.41	21.50
9.23	8.00	1.04	10.26	9.00	1.10	.....	1.10	1.00	.61	.78	b.12	.90	.87	22.00
9.10	8.00	1.60	10.70	9.00	1.00	.....	1.00	1.00	1.74	2.10	a.13	2.23	2.06	25.50
														28.00	

a, b, c. Characters indicating the proportions of insoluble nitrogen that is inactive: a—2/5 or more; b—2/5 to 3/5; c—3/5 or less.

*Constituent falls below guaranty.

COMPLETE FERTI

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
RASIN MONUMENTAL CO., BALTIMORE, MD.			
263	{†Rasin's Empire Guano,	Vineyard Supply Co., North East, ..	7.90
848	{Rasin's Half and Half Special,	J. T. Gemmell, Woodbine,	6.14
910	{†William Penn Crop Grower,	Bradford & Son, Centre Hall,	9.15
471	{	W. W. Book, Port Royal,	
408	{	Aspers Milling & Produce Co., Aspers, ..	
529	{	E. H. Keen & Co., Parksburg,	
R. A. REICHARD, ALLENTOWN, PA.			
819	{†Farmers' Choice Phosphate,	Monroe Savidge, Hegins, R. D., ..	3.57
583	{	John Kuntzman, Hellertown,	8.44
634	{	John Kuntzman, Hellertown,	7.24
653	{	John Kuntzman, Hellertown,	
REICHARD HIDE & TALLOW CO., ASHLAND, PA.			
1533	Farmers' Jewel,	Ruchland Hide & Tallow Co., Ashland, ..	5.15
1417	Reichard's Special,	Fred Craig, Catawissa,	7.00
F. S. ROYSTER GUANO CO., BALTIMORE, MD.			
198	{†Royster's Cuckoo Crop Grower,	H. P. Clark, Klingerstown,	6.07
48	{	Merton E. Haines, Pleasant Grove, ..	
221	{	Weaver & Berkey, Windber,	7.64
1189	{	Thos. O'Connell, Montrose,	7.57
330	{	Thos. Kintzleman, Tower City, R. D., ..	
329	{	Thos. Kintzleman, Tower City, R. D., ..	
224	{†Royster's Logical Compound,	Weaver & Berkey, Windber,	7.55
586	{	John Blorum, Clifford,	7.08
1491	{	W. H. Dunlap, Jr., Canonsburg, ..	
SCOTT FERTILIZER CO., ELKTON, MD.			
58	Scott's Potato Grower,	W. G. Mellinger & Bro., Willow, R. No. 1, ..	10.41
60	Scott's Potato and Truck,	W. G. Mellinger & Bro., Willow, R. No. 1, ..	7.00
59	Scott's Sure Growth Superphosphate,	W. G. Mellinger & Bro., Willow, R. No. 1, ..	7.29
SMITH AGRICULTURAL CHEMICAL CO., COLUMBUS, OHIO.			
785	Smith's Ammoniated Phosphate and Potash,	C. B. Forks, Albion,	6.33
SWACK'S FERTILIZER WORKS, INC., DUBOIS, PA.			
929	{†Swack's Corn Special,	H. E. Lutz, Bald Eagle,	4.50
1170	{	I. W. Gibson, Indiana,	3.20
49	{	E. P. Allen, Titusville,	6.01
332	{	Union Hdw. Co., Mifflinburg,	
245	{	Acme Milling Co., Corry,	
1039	{	Peter Hause, New Columbia,	
SWIFT & CO., BALTIMORE, MD.			
843	{†Swift's Pure Diamond K. Grain Grower,	J. A. Blough, Hollisapple, R. No. 1, ..	5.51
990	{	J. McCallough, Jr., Kittanning,	4.97
194	{	Thos. Haines & Co., Malvern,	
1237	{	Horn & Devling, Galeton,	
1177	{	Mills Bros., Carbondale,	6.55

†Composite sample.

LIZERS—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.					Nitrogen in 100 Pounds.					Selling price of 2,000 pounds at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive insoluble.	Total.			
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guarantee.		
9.27	8.00	1.59	10.80	9.00	1.33	.....	1.33	2.00	1.34	1.53	a.09	1.67	1.65	{ 33.50
9.77	8.00	1.38	11.13	9.00	.79	.....	.79	.50	.36	.....	.....	.56	.41	{ 30.50
8.99	8.00	1.54	10.53	9.00	1.28	.....	1.28	1.00	.59	.64	c.23	.86	.82	{ 21.00
														{ 25.00	
														{ 24.00	
7.51	7.00	.37	7.88	8.00	.80	.44	1.24	1.00	.38	.97	b.21	.96	.83	{ 28.00	
8.54	8.00	.51	9.05	9.00	.53	1.05	1.59	1.50	.35	.72	b.26	.83	.82	{ }	
6.45	6.00	.22	*5.77	7.00	1.38	.37	2.23	2.00	1.16	2.63	a.30	3.47	3.24	{ }	
9.35	8.00	1.00	10.94	10.00	1.50	.....	*1.50	2.00	.32	.30	b.63	1.52	1.64	23.00
*7.40	15.00	1.15	*8.55	17.50	.70	.....	.70	.50	1.32	5.23	a.23	7.54	3.69	27.00
7.84	9.00	.96	8.80	8.50	1.13	.....	1.13	1.00	.53	.75	b.15	.90	.83	{ 22.50
8.44	8.00	1.21	9.75	8.50	1.26	.....	1.26	1.00	1.39	2.63	b.65	3.28	3.29	{ 24.00
8.27	8.00	1.28	9.57	8.50	1.44	.....	1.44	1.00	1.37	1.84	b.52	3.47	3.47	{ 25.00
														{ 31.75	
8.23	8.00	1.10	9.33	8.50	1.19	.....	1.19	1.00	1.05	1.40	b.33	1.73	1.65	{ 23.25
9.12	8.00	1.00	10.73	8.50	1.04	.....	1.04	1.00	1.95	2.81	a.39	3.20	2.04	{ 25.00
														{ 25.00	
														{ 32.00	
11.74	10.00	1.73	13.47	.....	1.43	.....	1.43	1.00	1.02	1.45	b.45	1.90	1.65	23.00
10.27	9.00	1.22	11.49	.....	1.16	.....	1.16	1.00	2.13	2.60	a.26	2.86	2.50	31.00
9.89	8.00	3.21	12.07	.....	1.43	.....	1.43	1.00	1.17	1.53	b.47	2.67	1.65	27.00
9.34	9.00	.71	10.05	.....	.97	.....	.97	1.00	.43	.60	b.37	.87	.87	25.00
9.08	8.00	.63	10.30	9.00	1.00	.....	1.00	1.00	.53	.64	c.23	.84	.85	{ 25.00
7.20	7.00	.60	*7.80	8.00	.98	.....	.98	1.00	.37	.51	c.29	.50	.85	{ 25.00
9.37	8.00	1.17	10.49	9.00	1.20	.....	1.20	1.00	.32	1.13	b.56	1.74	1.69	{ 25.00
														{ 27.00	
13.47	13.00	1.08	14.51	.....	.97	.....	.97	1.00	.46	.63	b.16	.79	.82	{ 24.75
8.41	8.00	1.36	9.77	.....	.90	.....	.90	1.00	.94	1.30	b.31	1.65	1.65	{ 23.00
8.12	8.00	.77	8.90	.....	.94	.....	.94	1.00	1.23	1.84	b.38	2.52	2.47	{ 25.50
														{ 33.00	
														{ 31.25	

a, b, c. Characters indicating the proportions of insoluble nitrogen that is inactive: a=2% or more; b=3% to 5%; c=3% or less.

*Constituent falls below guaranty.

COMPLETE FERTI

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds
I. P. THOMAS & SONS CO., PHILADELPHIA, PA.			
144	{Improved Fertilizer,	J. K. Maurer, Pitman,	7.56
1063	{Normal Fertilizer,	Ed. Shuey, Annville, R. No. 2,	
1821	Tip Top Fertilizer,	McClellan Zinn, Carlisle,	6.33
1105	Truckers High Grade Manure,	T. M. Griffin & Son, Downingtown,	9.44
1489	{Victor Potash Fertilizer,	T. O. Bachman, Hellertown,	11.13
590	{Victor Potash Fertilizer,	Monroe A. Weik, Kleinfeltersville,	9.52
1401	{Victor Potash Fertilizer,	C. R. Hulrer, Millville,	
TUSCARORA FERTILIZER CO., BALTIMORE, MD.			
621	Tuscarora (2-8-1),	E. T. Abbott, Sugargrove,	6.02
J. E. TYGERT CO., BALTIMORE, MD.			
1002	Beacon Brand,	C. I. Saylor, Felton,	6.97
60	{Golden Harvest Phosphate, 1916,	J. Brennenman, Lisburn,	8.66
746	{Golden Harvest Phosphate, 1916,	D. H. Green, Little Gap,	
175	Popular Phosphate,	Harry McNair, Mechanicsville,	9.25
1071	Prolific Phosphate, 1916,	P. W. G. Raker, Elizabethville,	7.30
654	Quaker Special Fertilizer, 1916,	Emil Freedrich, Conyngham,	9.53
179	Standard Fertilizer, 1916,	Harry McNair, Mechanicsville,	9.88
VIRGINIA CAROLINA CHEMICAL CO., RICHMOND, VA.			
20	V. C. C. Co's. Champion Manure,	Cal. Diets, Red Lion,	7.95
1559	V. C. C. Co's. Special Compound for Wheat,	N. H. Diener, Brookville,	7.42
WARREN FERTILIZER CO., WARREN, PA.			
624	Warren Special Potato and Truck,	Pickett Hdw. Co., Warren,	7.49
WASHINGTON ALEXANDER & COOK CO., CHARLESTOWN, W. VA.			
399	W. A. & Co's. Wheat, Corn and Oats Mixture,	E. I. Kelly, Gettysburg,	8.12
W. E. WHANN CO., BY AM. AG. CHEM. CO., NEW YORK.			
11	{Whann's Chester Valley Fish and Potash Fertilizer, 1916,	W. F. Mundis, York, R. No. 8,	8.07
501	{Whann's Chester Valley Fish and Potash Fertilizer, 1916,	N. T. Sassaman, Ottsville,	
THE WOOLDRIDGE FERTILIZER CO., BALTIMORE, MD.			
1294	Tiger Phosphate,	Grant Johnson, Millville,	4.90
ROBERT A. WOOLDRIDGE CO., BALTIMORE, MD.			
475	{Woolridge Farmers' Favorite Cereal Compound, 1916,	J. M. Peterson, Honey Grove,	8.05
857	{Woolridge Farmers' Favorite Cereal Compound, 1916,	S. H. Shearer, Seven Valley, R. No. 1,	
147	{Woolridge Special Potato and Tobacco Fertilizer, 1916,	J. M. Scott, Montoursville, R. No. 2,	7.27
1119	{Woolridge Special Potato and Tobacco Fertilizer, 1916,	C. H. Cox & Bro., Phoenixville,	7.91
1120	{Woolridge Special Potato and Tobacco Fertilizer, 1916,	C. H. Cox & Bro., Phoenixville,	
YORK CHEMICAL WORKS, YORK, PA.			
681	{Dempwolf's Golden Sheaf,	Mt. Holly Feed & Grain Co., Mt. Holly,	5.27
675	{Dempwolf's Golden Sheaf,	W. H. Kramer, McAllisterville,	
112	{Dempwolf's Harvest Queen,	Strayer Bro. Co., York,	3.87
68	{Dempwolf's Harvest Queen,	Langford Bros., Compass,	
460	{Dempwolf's Plow Brand,	Maurice Leonard, McAllisterville,	4.50
476	{Dempwolf's Plow Brand,	J. M. Thompson, Honey Grove,	
1111	{Dempwolf's Plow Brand,	Thomas Haines Co., Malvern,	4.88
1261	Dempwolf's York Special,	Frederick & Myers, Mercersburg,	

†Composite sample.

LIZERS—Continued.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.					Nitrogen in 100 Pounds.					Selling price of 2,000 pounds at point of selection.
Available.			Total.		Present as muriate.	Present as sulphate.	Total.		Water soluble.	Available.	Inactive insoluble.	Total.			
Found.	Guaranteed.	Insoluble.	Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
9.01	10.00	.85	9.86	.....	1.32	.....	1.32	1.00	.72	.89	b.20	1.06	.82	{ 22.00
8.39	8.50	.84	9.23	9.00	1.00	.....	1.00	1.00	.96	1.37	a.22	1.59	1.00	{ 24.25
9.63	8.00	.85	10.48	8.50	.93	.....	.93	1.00	3.01	3.33	b.28	3.65	2.43	{ 28.00
10.62	8.00	1.95	12.57	8.50	.53	.96	1.48	1.00	1.75	2.73	a.36	3.09	3.23	{ 32.00	
12.77	12.00	.94	13.71	12.50	1.00	.....	1.00	1.00	.53	.85	a.20	1.06	.82	{ 26.00
7.85	8.00	.79	9.64	8.50	1.04	.....	1.04	1.00	1.06	1.37	b.37	1.74	1.65	28.70
11.96	10.00	1.19	13.15	11.00	.93	.....	.93	1.00	1.01	1.29	a.14	1.43	1.23	{ 24.25
9.28	8.00	.98	10.26	9.00	1.00	.....	1.00	1.00	.52	.86	a.17	1.03	.82	{ 22.50
8.44	7.00	1.08	9.47	8.00	.82	.....	.82	1.00	.49	.73	a.16	.89	.82	{ 22.00
8.59	8.00	1.20	10.00	9.00	1.16	.....	1.16	1.00	.60	.....	.....	.64	.41	{ 22.00
10.59	10.00	.87	11.26	11.00	1.32	.....	1.32	1.00	1.87	2.22	a.25	2.47	.82	{ 26.25
9.74	9.00	1.15	10.89	10.00	1.14	.....	1.14	1.00	1.21	1.62	a.27	1.87	1.65	{ 27.00
10.00	8.00	1.07	11.07	9.00	1.00	.....	1.00	1.00	.27	.43	b.18	.61	.41	{ 21.40
8.76	8.00	1.63	10.39	9.00	1.22	.....	1.22	1.00	.49	.62	c.23	.87	.82	{ 25.00
9.66	7.00	2.06	11.72	.....	2.38	.....	2.38	2.00	.91	1.43	b.56	1.99	1.46	33.00
9.08	8.00	1.07	10.10	9.00	1.30	.....	1.30	1.00	.....	.....	.....	.48	.41	20.00
10.82	10.00	1.34	12.16	11.00	1.12	.....	1.12	1.00	.....	.....	.....	1.76	1.65	{ 22.00
8.68	8.00	.77	9.40	8.50	.61	.....	.61	.50	.74	.98	b.17	1.10	1.09	{ 24.00
8.97	8.00	1.01	9.98	9.00	1.12	.....	1.12	1.00	.57	.....	.....	.68	.41	{ 23.50
11.27	10.00	1.28	12.55	11.00	.93	.....	.93	1.00	1.34	1.78	a.12	1.90	1.65	{ 27.50
11.64	10.00	.87	13.46	11.00	1.02	.....	1.02	1.00	.78	1.13	a.20	1.38	1.23	{ 31.00
8.32	8.00	.41	9.23	8.50	.48	.....	.48	.50	.16	.30	c.29	.56	.29	{ 18.50
8.15	8.00	.80	9.04	8.50	1.06	.....	1.06	1.00	.48	.66	b.32	.98	.87	{ 18.00
8.29	8.00	.45	8.74	8.50	.79	.....	*.79	1.00	.63	1.16	b.43	1.64	1.65	{ 26.00
7.98	8.00	.51	8.40	8.50	.72	.....	.72	.50	.21	.60	b.38	.98	.82	{ 27.00
														20.00	

a, b, c. Characters indicating the proportions of insoluble nitrogen that is inactive: a=2/5 or more; b=2/5 to 3/5; c=3/5 or less.

*Constituent falls below guaranty.

ROCK AND POTASH Furnishing Phosphoric

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.	Moisture in 100 pounds.
723 78 840	SWACK'S FERTILIZER WORKS, DUBOIS, PA. } †Swack's Lime, Phosphate & Potash,	W. H. Kaufman, R. No. 1, Har- mony. Sanford Runniger, Franklin, Union Hardware Co., Mifflinburg, ..	} 4.28

†Composite sample.

*Constituent falls below guaranty.

FERTILIZERS.

Acid and Potash.

Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.					Computed commercial value of 2,000 pounds at Department ratings.	Selling price of 2,000 pounds at point of selection.
Available.		Insoluble.	Total.		Present as muriate.	Present as sulphate.	Total.				
Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.			
4.82	4.00	.51	5.33	4.50	.6262	.50	{ 16.00 17.50 18.00	

DISSOLVED BONE AND OTHER Furnishing Phosphoric

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
	ALLENTOWN MANUFACTURING CO., ALLENTOWN, PA.	
665	Quick Return Phosphate,	Allentown Mfg. Co., Allentown,
666	Special Complete Phosphate,	Allentown Mfg. Co., Allentown,
	AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK.	
111	†Ammoniated Fertilizer A.,	Milton Nelson, Dover,
73		Shultz & Bardo, Franklin,
157		Reuben Person, Montgomery,
79		T. R. Bolton, Cochranton,
12	†Ammoniated Fertilizer A. A.,	W. F. Mundia, York, R. No. 3,
151		Reuben Person, Montgomery,
80		T. R. Bolton, Cochranton,
35		John Greenleaf, Quarryville,
155	†Ammoniated Fertilizer A. A. A.,	Reuben Person, Montgomery,
972		Theodore Gerhart, Gilberts,
269		Lake Shore Fruit Co., North East,
1102		F. C. Williams, Easton,
242	†Homestead Good Grower,	Davis & Hyde, Spartansburg,
1004		F. H. Shenberger, Red Lion, E. 1,
	AMERICAN FERTILIZER CO., BALTIMORE, MD.	
33	†American Ammoniated Phosphate,	A. B. Herr, Quarryville,
28		J. M. Peifer, Quarryville,
21		H. S. Newcomer, Mt. Joy,
178		H. M. Myers, Danboro,
875	†American Grain & Grass Ammoniated Phosphate,	J. H. Hartman, Hopbottom,
189		S. K. Chambers & Bro., Elkview,
	ARMOUR FERTILIZER WORKS, INC., BALTIMORE, MD.	
260	†Armour's 150-9-0,	Vineyard Supply Co., North East,
19		H. W. Burk, East Prospect,
279		H. S. Newcomer, Mt. Joy,
38		Brown & Shoemaker, Quarryville,
17	†Armour's 2-11-0,	H. W. Burg, East Prospect,
200		W. E. Erwin, Somerton,
	ATLANTIC FERTILIZER WORKS, BALTIMORE, MD.	
366	Atlantic 2-10-0 Brand,	James Coleman, Lerrysville,
	BALTIMORE FERTILIZER CO., BALTIMORE, MD.	
841	Honest Corn Grower,	J. N. Leightner, Gettysburg,
	BAUGH & SONS CO., PHILADELPHIA, PA.	
180	†Baugh's Corn & Oats Fertilizer,	J. Watson Craft, Ambler,
50		C. W. Fritz, Quarryville,
232		W. H. Brough, Davidsville,
814		W. Hass, Rec. Club, Pitman,
254	†Baugh's High Grade Ammoniated Animal Base,	Lake Shore Fruit Co., North East,
433		H. R. Lutz, Denver,
110		Milton Weiman, Dover,
51		C. W. Fritz, Quarryville,
131	†Baugh's Peninsula Grain Producer,	Curtin Updegrave, Sacramento,
836		Edwards Hdw. Co., Ebensburg,

†Composite sample.

ACIDULATED FERTILIZERS.

Acid and Nitrogen.

Moisture in 100 pounds.	Phosphoric Acid in 100 Pounds.					Nitrogen in 100 Pounds.					Selling price of 2,000 pounds at point of selection.
	Available.		Insoluble.	Total.		Water soluble.	Available.	Inactive—Insoluble.	Total.		
	Found.	Guaranteed.		Found.	Guaranteed.				Found.	Guaranteed.	
11.51 4.70	10.42 9.74	10.00 5.00	1.79 2.02	12.21 11.76	..... 10.00	.62 1.07	.89 1.85	b.39 b.67	1.28 2.57	1.00 2.26	28.50 27.50
8.47	10.87	10.00	1.25	12.12	11.00	.53	.74	b.14	.88	.83	20.00 25.00 18.75 25.00 22.00 22.25 28.00 25.00 12.75 30.00 30.00
7.06	10.99	10.00	1.68	12.67	11.00	1.15	1.50	a.20	1.70	1.65	
6.87	10.89	10.00	1.48	12.28	11.00	1.66	2.17	a.23	2.38	2.47	
5.74	10.77	10.00	1.22	11.99	11.00	2.04	2.64	a.23	*2.88	3.29	
5.29	8.16	8.00	1.24	9.40	9.00	1.47	1.99	a.24	2.14	2.08	24.50 23.00
2.05	12.39	10.00	1.40	13.79	11.00	.88	1.29	a.15	1.28	1.08	19.00 24.00 22.00
7.90	11.60	11.00	1.98	13.58	12.00	.90	1.43	a.20	1.63	1.65	19.50 23.00
7.67	12.33	12.00	1.02	13.35	13.00	.40	.78	a.21	.99	.83	
5.54	9.89	10.00	1.01	10.90	11.00	.20	.38	a.07	.49	.43	20.00
4.54	9.73	9.00	1.31	11.04	9.50	.59	.99	b.45	1.41	1.23	21.75 20.00 22.00 23.00
7.06	12.15	11.00	1.12	13.27	11.50	.54	1.00	b.59	1.69	1.65	23.00 26.00
6.00	*9.22	10.00	1.91	11.14	.....	.85	1.29	b.59	1.84	1.65	25.00
4.11	10.40	10.00	.41	10.81	11.00	.77	.83	c.25	1.08	.89	20.00
7.99	10.38	10.00	2.04	12.42	.....	.74	1.18	b.50	1.69	1.65	23.00 22.85 27.00 30.00 30.00 19.25 19.00 17.50 24.50
4.63	9.86	10.00	1.47	11.33	.....	1.95	2.70	b.54	3.29	3.30	
4.37	8.81	9.00	1.80	10.61	.....	.51	.71	b.25	.96	.83	
5.30	16.18	13.00	.89	17.07	.....	1.25	1.85	a.36	3.21	2.06	

a, b, c. Characters indicating the proportion of insoluble nitrogen that is inactive: a—2/5 or more; b—2/5 to 3/5; c—3/5 or less.
 *Constituent falls below guaranty.

DISSOLVED BONE AND OTHER AC

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
140	{Baugh's The Old Stand By Dissolved Animal Base.	H. W. Paul Leck Kill,
54		C. W. Frits, Quarryville,
510		H. M. Long, Oxford,
806		Wm. F. Hay, Somerset, R. No. 4,
856		Lake Shore Fruit Co., North East,
937	{Baugh's Trucker's Favorite,	J. M. Reese, Dallas,
BOWKER FERTILIZER CO., BOSTON, MASS.		
948	{Bowker's Superphosphate with Ammonia, 4%,	Michael Haster, Nescopeck,
1276	{Bowker's Superphosphate with Ammonia, 1%,	L. F. Harris, Harrisburg,
127	{Bowker's Superphosphate with Ammonia, 2%,	Geo. Maurer, Pitman,
643		D. S. Keck, Kutatown,
618		C. H. Saunders, Sugargrove,
947		Michael Harter, Nescopeck,
S. K. CHAMBERS & BROS., ELKVIEW, PA.		
189	Special Crop Grower,	S. K. Chambers & Bro., Elkview,
CAMBRIA FERTILIZER CO., JOHNSTOWN, PA.		
1567	Standard Phosphate,	H. J. Eberly, Oresson,
THOMAS FERTILIZER WORKS, CENTRAL CHEMICAL CO., HAGENSTOWN, MD.		
546	O. C. C. Acme Brand,	E. W. Kupp, Shiremanstown,
330	{O. C. C. Dissolved Bone,	Samuel Savidge, Valley View,
220		E. S. Thomas, Hollisapple,
544	{O. C. C. Truck Special,	E. W. Rupp, Shiremanstown,
808		S. V. Swank, Club Agt., Somerset, R. No. 2,
542		E. W. Rupp, Shiremanstown,
832		W. H. Diehl, Northumberland,
THE CHESAPEAKE CHEMICAL CO., BALTIMORE, MD.		
1219	O. C. Co's Buyer's Favorite,	I. C. Lockwood, Haliton,
COE MORTIMER CO., NEW YORK.		
436	{E. Frank Coe's High Grade Ammoniated Super Phosphate, 1916.	J. H. Reitz, Millway,
261		Vineyard Supply Co., North East,
938	{E. Frank Coe's Original Ammoniated Dissolved Phosphate, 1916.	Sherman Wardon, Dallas,
938		Sherman Wardon, Dallas,
1122	{E. Frank Coe's Prolific Crop Producer, 1916.	John W. Root, Kimberton,
1264		C. H. Kline, Lewistown,
732	{E. Frank Coe's XXV Ammoniated Phosphate, 1916.	Geo. J. New, Blainstown,
819		Adolf Boettinger, Danville,
COLUMBIA GUANO CO., BALTIMORE, MD.		
797	{Columbia Deluxe Ammoniated Super Phosphate.	Schrock Bros., Friedens,
1404	{Columbia Miracle Ammoniated Super Phosphate.	I. G. Washburn, Millville,
1384		M. P. Whitenight, Bloomsburg,
63	{Columbia Reflex Ammoniated Super Phosphate.	P. F. Schall, Cochranston,
380		C. H. Schmucker, Friedens,
CONSUMER'S CHEMICAL CORPORATION, NEW YORK.		
753	{Consumer's Pure & Sure Ammoniated Bone Phosphate.	L. A. Steigerwalt, Sittlers,
1063	{Consumer's Pure & Sure Corn & Grain Bone Phosphate.	W. B. Goodhart, Catawissa,
368		Thos. M. Allyn, Nickols, N. Y.,
1386	{Consumer's Pure & Sure Potato Manure without Potash.	Zehner Bros., Bloomsburg,
754		L. A. Steigerwalt, Sittlers,
751	Consumer's Pure & Sure Potato & Vegetable without Potash.	L. A. Steigerwalt, Sittlers,

†Composite sample.

IDULATED FERTILIZERS—Continued.

Moisture in 100 pounds.	Phosphoric Acid in 100 Pounds.					Nitrogen in 100 Pounds.					Selling price of 4,000 pounds at point of selection.	
	Available.		Insoluble.	Total.		Water soluble.	Available.	Inactive-insoluble.	Total.			
	Found.	Guaranteed.		Found.	Guaranteed.				Found.	Guaranteed.		
8.73	12.23	12.00	2.29	14.5298	1.39	b.36	1.74	1.65	{ 29.50 23.25 24.00 24.55 26.75 27.75	
7.86	10.68	10.00	1.23	12.00	.....	1.68	2.07	b.40	2.47	2.47	
4.97	10.87	10.00	1.12	11.99	11.00	1.76	2.67	b.75	3.42	3.29		{ 28.00 24.00 17.51 26.50 22.65 24.00
6.55	11.59	10.00	1.04	12.63	11.00	.61	.88	a.10	.98	.83		
5.63	10.56	10.00	1.46	12.02	11.00	1.23	1.59	a.17	1.76	1.65		
5.83	9.59	9.00	.47	10.06	9.50	.87	1.09	b.28	1.34	1.22			23.00
1.78	11.51	7.00	1.12	12.64	9.00	.59	1.16	b.44	1.62	1.50	26.00	
7.43	8.94	8.00	.28	9.2259	.65	c.19	.34	.83	{ 19.00 26.00 27.00 26.50	
8.45	12.46	12.00	2.12	14.58	.....	1.04	1.67	a.37	2.04	2.05	
6.42	10.69	10.00	.85	11.54	.....	.94	1.69	b.59	*2.19	2.50
5.97	10.25	10.00	1.99	12.19	11.00	.59	.79	b.35	1.12	.89	
6.12	11.19	10.00	1.30	12.49	11.00	1.74	2.25	a.30	2.55	2.47		{ 26.75 21.00 24.00 20.00
6.45	11.20	10.00	1.23	12.43	11.00	1.07	1.44	a.23	1.67	1.65		
7.17	10.85	10.00	1.68	12.24	11.00	2.05	2.66	a.43	*3.08	3.29		
8.96	10.59	10.00	1.21	11.80	11.00	.66	.87	a.17	1.00	.83		
5.51	13.15	12.00	1.23	14.43	12.50	1.21	1.68	a.25	1.93	2.06	{ 23.75 26.00 23.00 22.00 21.00	
6.29	10.37	10.00	.83	11.20	10.50	1.23	1.53	b.23	1.80	1.65		
5.23	10.90	10.00	.92	11.82	10.50	.52	.78	a.19	.90	.82		
6.39	11.07	10.00	1.53	12.60	11.00	1.06	1.56	a.21	1.77	1.65		
9.52	12.23	12.00	1.53	14.46	13.00	1.24	1.55	a.12	1.67	1.65		
4.71	11.23	10.00	1.34	12.57	11.00	3.06	3.63	a.26	*3.39	4.12		
2.39	11.16	10.00	1.36	12.52	11.00	1.98	2.86	a.43	3.23	3.29		

a, b, c. Characters indicating the proportion of insoluble nitrogen that is inactive: a=2/5 or more; b=2/5 to 3/5; c=3/5 or less.
*Constituent falls below guaranty.

DISSOLVED BONE AND OTHER AC

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
387	Consumer's Pure & Sure Corn & Vegetable without Potash.	Albert Henryou, Carbondale.
	HENRY COPE & CO., LINCOLN UNIVERSITY, PA.	
515	Ammoniated Phosphate,	L. Whitaker, Oxford,
514	Maryland Special,	L. Whitaker, Oxford,
516	Potato & Corn Phosphate,	L. Whitaker, Oxford,
	JOSIAH COPE & CO., BALTIMORE, MD.	
1270	Ammoniated Fertilizer A. A.,	Jas. Jacobs, York Springs,
	DUNGAN FERTILIZER CO., DOYLESTOWN, PA.	
215	Farmer's Favorite,	Dungan Fertilizer Co., Doylestown,
	EASTERN CHEMICAL CO., NEW YORK.	
1266	Fish Bone Mixture,	Diehl, Omwake & Diehl, Chambersburg,
	ERIE REDUCTION CO., ERIE, PA.	
252	Acidulated Fish Special,	W. D. Ripley, Wesleyville,
	FARMERS FERTILIZER SEED & HAY CO., WOMELSDORF, PA.	
34	Grass & Grain Grower,	A. B. Herr, Quarryville,
	JOSEPH R. GAWTHROP, KENNETT SQUARE, PA.	
504	Special Potato Phosphate,	Jos. R. Gawthrop, Kennett Square,
	GRIFFITH & BOYD CO., BALTIMORE, MD.	
13	{†Cereal Mixture,	{Geo. A. Wolf & Son, Mt. Wolf,
1148	{†Pure Dissolved Animal Bone,	{F. S. Saddler, Point Marion,
267	{†Farmer's Bone Mixture,	{W. C. Herr, Strasburg,
14	{†Fish & Bone Mixture,	{Geo. A. Wolf & Son, Mt. Wolf,
130	{†Fish & Bone Mixture,	{Artley Bros., Muncy,
150	{†Fish & Bone Mixture,	{Weaver & Callahan, Montoursville,
72	{†Fish & Bone Mixture,	{Willis C. Herr, Strasburg,
181	{†Fish & Bone Mixture,	{S. K. Chambers & Bros., Elkview,
	S. M. HESS & BRO., PHILADELPHIA, PA.	
582	Reliable Super Phosphate,	H. M. Hostetter, Campbelltown,
486	{†Standard Super Phosphate,	{Thomas Slack, Wycombe,
308	{†Standard Super Phosphate,	{N. N. Basehoar, Littletown, R. No. 2, ...
580	{†Standard Super Phosphate,	{H. M. Hostetter, Campbelltown,
485	{†Standard Super Phosphate,	{Thomas Slack, Wycombe,
307	{†Superior Super Phosphate,	{N. N. Basehoar, Littletown, R. No. 2, ...
583	{†Superior Super Phosphate,	{H. M. Hostetter, Campbelltown,
	HUBBARD FERTILIZER CO., BALTIMORE, MD.	
461	{†Hubbard's Ammoniated Fertilizer,	{W. H. Sieber, McAllisterville,
1434	{†Hubbard's Crop Maker,	{James Mullen, Woodland,
98	{†Hubbard's Crop Maker,	{H. W. Burg, East Prospect,
357	{†Hubbard's Excelsior Mixture,	{C. H. Schmucker, Friedens,
97	{†Hubbard's Excelsior Mixture,	{H. W. Burg, East Prospect,
256	{†Hubbard's Oriental Guano,	{C. H. Schmucker, Friedens,
843	{†Hubbard's Oriental Guano,	{J. Emery Moul, Iron Ore,
	M. P. HUBBARD & CO., BALTIMORE, MD.	
825	{†Hubbard's Atlas Guano,	{Jos. A. Gass, Sunbury,
1269	{†Hubbard's Great Harvest,	{Alfred Harbold, Bermudian,
302	{†Hubbard's Great Harvest,	{M. J. Scheffer, Hanover,
378	{†Hubbard's Slaughter House Formula,	{Billings & Keldar, New Albany,
1896	{†Hubbard's Slaughter House Formula,	{Seymore Lockard, Millville, R. No. 1,

†Composite sample.

INDULATED FERTILIZERS—Continued.

Moisture in 100 pounds.	Phosphoric Acid in 100 Pounds.					Nitrogen in 100 Pounds.					Selling price of 2,000 pounds at point of selection.
	Available.		Insoluble.	Total.		Water soluble.	Available.	Inactive—Insoluble.	Total.		
	Found.	Guaranteed.		Found.	Guaranteed.				Found.	Guaranteed.	
9.25	10.30	10.00	1.92	12.22	11.00	1.75	2.17	b.33	2.50	2.47	24.00
10.76	10.33	10.00	1.21	11.54	.....	1.22	1.49	b.31	*1.80	2.06	23.00
8.61	*11.17	13.00	4.43	15.60	.....	1.08	1.65	a.17	*1.32	2.06	23.00
10.71	11.36	10.50	.77	12.13	.....	1.91	1.99	c.17	*2.16	2.47	23.00
7.81	11.24	10.00	1.40	12.64	11.00	1.23	1.45	a.31	1.76	1.65	23.60
9.30	10.11	8.00	2.32	12.43	9.00	.87	1.48	a.30	1.73	.82	25.00
5.23	10.53	10.00	.79	11.37	.....	.57	.86	b.28	1.14	1.25	21.50
3.26	10.32	9.00	1.08	11.35	11.00	.36	.69	b.41	1.10	1.23	21.00
6.99	4.61	.....	1.19	5.80	4.50	1.23	2.33	b1.62	3.95	4.12	27.00
7.99	7.30	5.00	1.08	8.38	6.00	.15	.53	c.62	1.15	1.00	24.00
5.00	9.13	8.00	2.23	11.46	9.00	.47	.73	a.18	.96	.85	17.00
7.81	11.73	10.00	2.04	13.82	11.00	1.34	1.83	b.44	2.27	2.00	25.00
7.83	*8.77	9.00	1.59	10.36	10.00	.77	1.12	b.53	1.65	1.63	21.00
4.47	8.41	7.00	.73	9.14	8.00	.41	.81	b.46	*1.27	1.50	24.00
5.98	10.76	10.00	.73	11.46	11.00	1.95	2.82	a.34	3.16	2.47	.....
7.66	10.96	10.00	.85	11.81	11.00	.83	1.06	a.13	1.19	.82	23.00
7.70	10.62	10.00	1.03	11.65	11.00	1.15	1.53	a.13	1.71	1.65	21.25
3.80	10.30	10.00	1.06	11.36	11.00	2.21	2.73	b.36	3.09	2.46	.....
9.23	11.64	10.00	1.35	12.99	11.00	.53	.71	c.36	1.07	1.02	25.20
8.06	10.68	10.00	1.34	12.02	11.00	.91	1.19	b.43	1.62	1.64	21.00
8.37	11.92	10.00	1.62	13.54	11.00	.43	.57	c.30	.87	.82	23.00
7.90	12.42	12.00	1.07	13.49	13.50	.58	.77	b.22	.99	.82	23.00
8.74	10.66	10.00	.77	11.43	11.50	1.12	1.61	b.40	2.01	1.65	23.00
10.76	14.50	13.00	.45	14.95	14.50	.44	.93	a.31	*1.24	1.65	24.00

a, b, c. Characters indicating the proportion of insoluble nitrogen that is inactive: a=2/5 or more; b=2/5 to 3/5; c=3/5 or less.

*Constituent falls below guaranty.

DISSOLVED BONE AND OTHER AC

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
INTERNATIONAL AGRICULTURAL CORPORATION, BUFFALO FERTILIZER WORKS, BUFFALO, N. Y.		
1235	Buffalo Garden Truck,	A. T. Larson, Kane,
91	{ Buffalo Ideal Wheat & Corn,	H. B. Edwards & Co., Titusville,
1228	{ Cereals,	A. T. Larson, Kane, R. F. D.,
98	{ Buffalo Vegetable & Potato,	H. B. Edwards Co., Titusville,
1227		A. T. Larson, Kane,
JARECKI CHEMICAL CO., SANDUSKY, O.		
1131	Ammoniated Phosphate,	S. S. Mossholder, Rockwood,
788	{ Cereals,	Chas. C. Good Co., North Girard,
1130		S. S. Mossholder, Rockwood,
F. S. KENDERDINE & SONS, NEWTOWN, PA.		
1448	Kenderdine's Ammoniated Phosphate,	F. S. Kenderdine, Newtown,
1459	Kenderdine's B. Phosphate,	F. S. Kenderdine, Newtown,
1451	Kenderdine's 4-10-0 Phosphate,	F. S. Kenderdine, Newtown,
1449	Kenderdine's Potato Phosphate,	F. S. Kenderdine, Newtown,
KEYSTONE BONE FERTILIZER CO., PHILADELPHIA, PA.		
1040	1916 Keystone Economy Grain Compound,...	E. A. Slagle, Paxinos,
KEYSTONE GRANGE EXCHANGE, MANSFIELD, PA.		
340	Grangers Brand,	J. A. Blough, Hollsopple, R. No. 1,
323	Grangers Choice,	Hegins Grange, Hegins, R. D.,
322	{ Grangers Emergency Compound,	Hegins Grange, Hegins, R. D.,
338		J. A. Blough, Hollsopple,
KOLLER FERTILIZER CO., SEITZLAND, PA.		
101	Koller Two and Twelve,	J. W. Sheffer, Red Lion, R. No. 2,
LANCASTER BONE FERTILIZER CO., LANCASTER, PA.		
919	{ Ammoniated Bone Manure,	Ira Bechtel, Roaring Springs,
104	{ National Crop Grower,	Josiah Flinchbaugh, Windsor,
1047	{ Scientific Organic Compound,	Calvin Sower, Sellingsgrove,
777		A. L. Veit, McKean,
920		Ira Bechtel, Roaring Springs,
551		Harry Hoffnagle, New Oxford,
863		J. F. Schuchart, New Freedom,
LANCASTER CHEMICAL CO., LANCASTER, PA.		
485	{ No. 10 Economist,	Christian Winey, McAllisterville,
40	{ No. 5 Flag Brand,	Brown & Shoemaker, Quarryville,
588		J. L. Royer, Myerstown,
447		E. B. Ruhl & Son, Manheim,
483	No. 6 Grain Special,	Christian Winey, McAllisterville,
511	No. 11 Keystone Brand,	H. M. Long, Oxford,
484	{ No. 14 Wheat & Grass,	Christian Winey, McAllisterville,
585		J. L. Royer, Myerstown,
652		Wm. H. Hoffman, New Tripoli, R. No. 1,
LISTER'S AGRICULTURAL CHEMICAL WORKS, NEWARK, N. J.		
650	Lister's Celebrated Ground Bone & Acidulated Tankage,	Geo. F. Herber, Jordan,
372	Lister's Excelsior Guano, 1916,	Ell Witmer, Lampeter,
66	{ Lister's Plant Food, 1916,	Harry Mullen, Christiansa,
153	{ Lister's Crescent Ammoniated Super Phosphate, 1916,	David Garrett, Montgomery,
154		David Garrett, Montgomery,
292		J. C. Ernst & Co., York,

†Composite sample.

IDULATED FERTILIZERS—Continued.

Moisture in 100 pounds.	Phosphoric Acid in 100 Pounds.					Nitrogen in 100 Pounds.					Selling price of 2,000 pounds at point of selection.
	Available.		Insoluble.	Total.		Water soluble.	Available.	Inactive—Insoluble.	Total.		
	Found.	Guaranteed.		Found.	Guaranteed.				Found.	Guaranteed.	
12.15	10.63	9.00	1.34	12.02	.....	2.04	2.72	a.43	3.14	3.30	23.00
4.56	11.22	10.00	2.18	13.40	.....	.96	1.42	b.32	1.74	1.80	26.50
9.14	11.37	10.00	2.01	13.38	.....	1.74	2.17	b.34	2.61	2.60	26.00
8.80	10.50	10.00	.80	11.39	11.00	.33	.53	b.29	.82	.82	18.75
10.42	12.61	12.00	.96	13.56	13.00	1.16	1.62	a.10	1.77	1.66	24.50
7.42	9.49	10.00	1.52	*11.01	12.00	.76	.97	b.24	1.21	.80	24.00
6.57	10.94	10.00	.84	*11.78	12.00	2.13	2.58	b.36	2.79	2.47	29.00
5.29	10.11	10.00	1.42	*11.53	12.00	2.11	2.70	b.46	3.16	3.23	28.00
9.24	10.66	10.00	1.07	*11.77	12.00	.....	.....	.....	1.79	1.66	28.00
5.32	10.22	8.00	1.29	11.52	9.00	.50	.68	c.37	1.04	.33	20.00
7.00	11.59	10.00	1.25	12.84	11.00	.89	1.11	a.01	1.12	.82	19.00
8.39	12.18	11.00	1.47	13.65	12.00	.93	1.61	a.27	1.83	1.65	22.00
8.09	12.79	12.00	1.62	14.41	13.00	1.56	2.08	a.19	*2.22	2.47	25.00
11.12	12.82	12.00	1.09	13.84	13.00	.60	1.17	b.30	1.56	1.66	21.00
4.06	9.27	9.00	.96	10.23	10.00	.48	.65	b.25	.90	.33	22.00
4.81	8.54	8.00	.38	8.92	9.00	.38	.48	c.18	.66	.41	21.00
4.67	10.50	9.00	1.72	11.22	10.00	.55	.96	b.30	1.35	1.40	20.00
5.25	10.35	10.00	.84	11.19	11.00	.....	.....	.....	.....	.....	15.50
9.03	10.31	10.00	1.17	11.48	11.00	.78	1.09	a.14	1.12	1.22	16.50
7.30	9.99	10.00	.97	10.96	11.00	.35	.....	.....	.49	.41	20.50
5.73	9.96	8.00	1.25	11.24	9.00	.61	.76	b.11	.88	.32	18.00
8.32	9.94	10.00	1.36	11.30	11.00	.68	.88	a.13	1.00	.37	17.00
11.90	8.59	.....	4.13	12.72	12.00	1.72	2.83	b.51	3.64	2.67	24.00
7.11	10.30	10.00	.73	11.72	11.00	1.71	2.61	a.23	2.90	2.47	28.50
7.76	10.51	10.00	1.14	11.66	11.00	.70	.91	a.00	1.00	.32	20.00
7.91	10.37	10.00	1.69	12.06	11.00	1.15	1.44	a.19	1.63	1.66	21.00
											23.50
											25.00

a, b, c. Characters indicating the proportion of insoluble nitrogen that is inactive: a—2/5 or more; b—2/5 to 3/5; c—3/5 or less.
 *Constituent falls below guaranty.

DISSOLVED BONE AND OTHER AC

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
	LEBANON FERTILIZER WORKS, LEBANON, PA.	
676 1061	{†Levan's General Crop Grower Fertilizer, }	{ J. H. Stover, Thompsontown, } { A. E. Reist, Palmyra, }
	FREDERICK LUDLAM CO., BALTIMORE, MD.	
161 587 162 295 163	{†Ludlam's Sickle Fertilizer No. 1, 1916, ... } {†Ludlam's Sickle Fertilizer No. 2, 1916, ... } Ludlam's Sickle Fertilizer No. 3, 1916,	{ B. L. Shipman, Muncy, R. No. 4, } { G. H. Dittenjer, York, } { B. L. Shipman, Muncy, R. No. 4, } { Sechrist & Ihric, York, R. No. 2, } { B. L. Shipman, Muncy, R. No. 1, }
	MILLER FERTILIZER CO., BALTIMORE, MD.	
845 518 1028 823 271 860	{†Farmers Profit, } {†Femlice, }	{ Nelson Merryman, Fawn Grove, } { Miller T. Harkins, Hickory Hill, } { A. S. Welch, Mt. Union, } { Jos. A. Goss, Sunbury, } { Eli Witmer, Lampeter, } { J. P. Schuchart, New Freedom, }
	NASSAU FERTILIZER CO., NEW YORK.	
944 941 1185	{Common Sense Fertilizer, 1916, } {†Old Hickory, 1916, }	{ S. D. Seward, Berwick, R. No. 2, } { Lewis Hunte, Dallas, R. D., } { Matt Griffin, Montrose, }
	G. ORER & SONS CO., BALTIMORE, MD.	
1265 965	Ober's Electric Compound, Ober's Sun Beam Guano,	{ W. J. Weiland, Lewistown, } { Summit Lumber Co., New Freedom, }
	PATAPSCO GUANO CO., BALTIMORE, MD.	
897 677 1179	{†Patapsco Ammoniated Compound, } Patapsco Prize Crop Compound,	{ E. C. Thomas, Gettysburg, } { J. S. Harley, Thompsontown, } { Wm. Russell, Carbondale, }
	PIEDMONT MT. AIRY GUANO CO., BALTIMORE, MD.	
932 391 1077 64 43 401	{†Piedmont Special Crop Grower, } {†Piedmont Utility Fertilizer, }	{ A. F. Stutsman & Son, Johnstown, } { G. K. Thompson, Gettysburg, R. No. 3, .. } { Long & Miller, Liverpool, } { Harry Mullen, Christiansa, } { Brown & Shoemaker, Quarryville, } { H. D. & J. F. Bream, Gettysburg, }
	PITTSBURGH PROVISION & PACKING CO., PITTSBURGH, PA.	
349 90 737 40	{†Guano Fertilizer, } Lawn Fertilizer,	{ J. Z. Rhoads, Stoyestown, R. No. 1, } { W. J. Gibson, Titusville, } { Geo. Reuton & Co., Castle Shannon, } { Geo. Reuton & Co., Castle Shannon, }
	POLLOCK FERTILIZER CO., BALTIMORE, MD.	
414 311 801 550 1330 802	{†The Pollock Fertilizer Co. Ammoniated Fertilizer A. } {†The Pollock Fertilizer Co. Ammoniated Fertilizer A. A. } The Pollock Fertilizer Co. Ammoniated Fertilizer A. A. A.	{ Francis Baker, Everett, } { J. N. Duthres, New Oxford, } { W. H. Shaffer, Somerset, R. No. 2, } { Wm. Munma, Mechanicsburg, } { J. H. Scott, Petersburg, } { W. H. Shaffer, Somerset, R. No. 2, }
	PUGH & LYONS, OXFORD, PA.	
1462	B. R. P. Phosphate,	{ C. R. Kirk & Co., Oxford, }
	THE RAMSBURG FERTILIZER CO., FREDERICK, MD.	
1367 1368	Ammoniated Phosphate, Excelsior Plant Food,	{ Frank Miller & Son, Greencastle, } { Frank Miller & Son, Greencastle, }

†Composite sample.

IDULATED FERTILIZERS—Continued.

Moisture in 100 pounds.	Phosphoric Acid in 100 Pounds.					Nitrogen in 100 Pounds.					Selling price of 2,000 pounds at point of selection.
	Available.		Insoluble.	Total.		Water soluble.	Available.	Inactive—Insoluble.	Total.		
	Found.	Guaranteed.		Found.	Guaranteed.				Found.	Guaranteed.	
8.39	10.28	10.00	1.38	11.64	11.00	.65	.85	b.23	1.07	.33	{ 22.00
8.86	11.20	10.00	1.00	12.20	11.00	.61	.80	b.15	.95	.33	{
7.33	10.30	10.00	1.91	12.21	11.00	1.29	1.63	a.13	1.80	1.65	{ 23.00
8.89	10.73	10.00	1.50	12.23	11.00	1.88	2.37	a.31	2.68	2.47	{
11.55	8.98	9.00	.40	9.38	9.50	1.04	1.23	b.26	1.49	1.44	{ 21.00 20.00 20.00 20.00 20.00
8.83	8.32	8.00	.34	8.66	8.50	1.96	2.31	b.19	2.49	2.47	{ 26.75 24.00
8.48	10.50	10.00	1.09	11.99	11.00	1.26	1.61	b.24	1.85	1.65	{ 22.00
8.82	10.30	10.00	.85	11.15	11.00	.67	.90	a.14	1.04	.33	{ 21.00 21.00
8.00	11.81	10.00	.80	12.61	11.00	.63	.84	b.21	1.05	.33	{ 19.25
10.26	11.98	10.00	.87	12.85	11.00	1.08	1.41	b.27	1.63	1.65	{ 21.00
8.66	10.72	10.00	1.00	11.72	11.00	.62	.80	b.18	.96	.33	{ 20.00 18.50 22.00
8.93	10.39	10.00	1.66	12.05	11.00	2.41	3.07	a.23	3.45	3.29	{
5.16	10.53	10.00	.54	11.07	.....	.61	.85	b.23	1.13	.33	{ 25.00 13.50 22.50 22.50 23.75
6.14	10.67	10.00	.85	11.52	.....	.69	1.17	b.60	1.77	1.65	{
4.71	8.96	9.00	2.32	11.28	11.00	.41	1.05	b.70	1.75	1.43	{ 21.00 24.00 22.00 25.00
4.95	11.17	4.00	4.21	15.38	16.00	.54	2.00	a.94	2.94	2.87	{
9.47	11.13	10.00	1.15	12.28	11.00	.61	.81	b.17	.98	.33	{ 21.00 18.50 19.00 23.50 24.00
7.25	10.46	10.00	1.64	12.10	11.00	1.52	1.91	a.15	2.06	1.65	{
5.62	11.25	10.00	1.53	12.80	11.00	1.75	2.21	a.29	2.50	2.47	{
8.23	12.70	.....	4.43	18.13	7.00	.64	1.04	a.22	1.28	.33	{ 20.00
4.70	13.28	11.00	2.00	15.28	.....	.42	.64	b.29	.92	.33	{ 20.00
7.82	13.81	10.00	2.18	15.47	.....	1.01	1.81	b.31	1.62	1.65	{ 24.00

a, b, c. Characters indicating the proportion of insoluble nitrogen that is inactive: a=2/5 or more; b=2/5 to 3/5; c=3/5 or less.

*Constituent falls below guaranty.

DISSOLVED BONE AND OTHER AC

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
RASIN MONUMENTAL CO., BALTIMORE, MD.		
307	Rasin's Grain & Grass Ammoniated Superphosphate.	Miller & Levan, Somerset, R. No. 4.
1425	Rasin's Matchless Ammoniated Phosphate.	Chas. Yeackle, Patton.
1388	Rasin's Potato & Vegetable Ammoniated Superphosphate.	H. B. Low & Son, Orangeville.
37	†Rasin's Royal Ammoniated Superphosphate.	John Hayes, White Rock.
407	†Rasin's Special Crop Preparation.	Aspers Milling & Produce Co., Aspers.
694	†Rasin's United Grain Ammoniated Superphosphate.	S. O. Weber, Boalsburg.
808		Miller & Lavan, Somerset, R. No. 4.
768		A. F. Kimmell, Orwigsburg.
909		Bradford & Son, Centre Hall.
READING BONE FERTILIZER CO., READING, PA.		
628	†Reading All Crop Special.	F. A. Sheerer, Slatington.
142		Elmer Leitzel, Leck Kill.
1107		W. W. Moses, Exton.
592	Reading Harvest Queen.	C. R. Bucker, McVeytown.
868	High Grade Truck Food.	J. W. Rider, Falls.
867	Reading Prize Winner.	J. W. Rider, Falls.
546	†Schuylkill Valley Favorite.	J. F. Ritter, Carlisle, R. No. 7.
1109		W. W. Moses, Exton.
591	†Reading Special Potato & Tobacco Manure.	C. R. Bucker, Myerstown.
129	†Tobacco & Truck Special.	W. H. Maurer, Sec. Hegins.
655		Fred L. Pfeiffer, Lynnport.
441		B. H. Hershey, Manheim.
593		C. R. Bucker, Myerstown.
1182	Truck, Fruit Tree, Vine, Potato, Tobacco Grower.	Geo. H. Lewis, Montrose.
READING CHEMICAL CO., READING, PA.		
1186	Reading Big Crop Special.	Geo. Rose, Montrose.
1452	Early Truck, Tobacco & Potato.	John Kirkpatrick, Newtown.
1023	†Reading Grain Special.	W. S. Watkins, Slatton.
833	†Farmers Meat & Potash Mixture.	C. L. Shipman, Hughesville.
1026		J. L. Enyeast, Shirlleysburg.
82		A. B. Herr, Quarryville.
872		Chas. Pollman, Clark Summit.
15	†Pennant Winner.	C. J. Shaffer, Manchester.
834		C. L. Shipman, Hughesville.
873		Chas. Pollman, Clark Summit.
R. A. REICHARD, ALLENTOWN, PA.		
317	†American Eagle Phosphate.	Monroe Savidge, Hegins, R. D.
632		John Kuntzman, Hellertown.
F. S. ROYSTER GUANO CO., BALTIMORE, MD.		
223	†Royster's Flamingo Ammoniated Superphosphate.	Weaver & Berkey, Windber.
902	†Royster's Curfew Ammoniated Superphosphate.	Urias Snyder, Red Lion, R. No. 2.
172		Wm. C. Ball, Media.
1057		S. A. Phillippy, Myerstown, R. No. 4.
84	†Royster's Royal Blue Ammoniated Superphosphate.	W. O. Work & Sons, Cochranston.
47		Merton E. Haines, Pleasant Grove.
171		Wm. C. Ball, Media.
SCHALL-SHELDON FERTILIZER CO., BUFFALO, N. Y.		
244	Ammoniated Super Phosphate, No. 1.	Brooklyn Milling Co., Spartansburg.
243	Ammoniated Super Phosphate, No. 2.	Brooklyn Milling Co., Spartansburg.

†Composite sample.

IDULATED FERTILIZERS—Continued.

Moisture in 100 pounds.	Phosphoric Acid in 100 Pounds.					Nitrogen in 100 Pounds.					Selling price of 2,000 pounds at point of selection.
	Available.		Insoluble.	Total.		Water soluble.	Available.	Inactive—Insoluble.	Total.		
	Found.	Guaranteed.		Found.	Guaranteed.				Found.	Guaranteed.	
5.66	14.06	12.00	1.25	15.31	13.00	1.02	1.46	a.19	1.65	.83	18.50
8.84	13.21	12.00	1.41	14.61	12.00	.94	1.31	a.15	1.46	1.65	23.50
5.24	8.83	8.00	.91	9.80	9.00	2.39	2.07	a.23	3.29	3.29	27.00
6.93	12.28	10.00	1.34	13.62	11.00	.58	.81	a.06	.87	.41	17.50
3.68	10.74	10.00	1.09	11.83	11.00	1.06	1.47	a.20	1.67	1.65	18.00
4.49	10.65	10.00	1.25	11.90	11.00	.79	1.17	a.10	1.27	1.09	21.85
											20.00
											24.00
3.79	*9.73	10.00	2.27	12.00	11.00	1.17	1.46	.07	1.53	1.64	23.00
4.62	10.14	10.00	2.46	12.60	11.00	.76	.98	a.09	1.07	1.03	22.00
5.47	12.51	12.00	1.94	14.45	13.00	2.16	2.60	a.13	*2.73	3.29	30.00
4.06	10.63	9.00	1.75	12.43	10.00	1.84	2.27	a.13	2.40	2.46	26.00
2.87	7.98	7.00	1.30	9.29	8.00	.46	.70	a.10	.89	.43	16.50
											18.00
3.89	12.07	12.00	2.09	14.10	13.00	.65	.86	a.05	.91	.82	19.75
3.24	6.68	6.00	2.17	8.85	7.00	1.88	2.32	a.04	2.36	2.46	22.00
4.83	8.24	8.00	1.68	9.92	9.00	2.10	2.63	a.09	*2.72	3.29	26.00
											23.79
5.71	8.48	8.00	1.12	9.55	9.00	.87	1.14	b.38	1.52	1.64	20.00
4.13	10.57	10.00	.65	11.12	11.00	2.98	3.15	a.11	3.26	3.28	28.00
3.30	7.63	7.00	.83	7.95	8.00	.48	.54	b.12	.66	.41	19.50
6.01	18.58	8.00	.64	19.17	9.00	.55	.64	c.17	.82	.82	18.00
											17.85
											19.00
5.09	10.57	10.00	.74	11.31	11.00	1.21	1.82	b.69	2.45	2.46	33.00
											29.00
5.79	10.59	9.00	1.28	11.87	10.00	.42	1.09	b.54	1.63	1.64	28.50
										
7.30	12.19	12.00	.88	14.07	12.50	1.46	1.93	b.31	2.24	2.06	26.00
3.79	9.24	8.00	1.15	10.39	8.50	1.59	2.57	a.88	*2.66	3.29	30.00
											37.25
											21.50
5.46	10.01	10.00	.94	10.94	10.50	.59	.71	a.12	.83	.83	18.25
											23.00
6.74	9.33	10.00	1.24	11.06	11.00	.86	.63	a.17	.80	.83	.....
5.62	*9.72	10.00	1.81	11.53	11.00	1.07	1.55	a.20	1.75	1.65	.....

a, b, c. Characters indicating the proportion of insoluble nitrogen that is inactive: a=2/5 or more; b=2/5 to 3/5; c=3/5 or less.
 *Constituent falls below guaranty.

DISSOLVED BONE AND OTHER AC

Sample number.

Manufacturer and Brand.

From Whom Sample Was Taken.

M. L. SHOEMAKER & CO., PHILADELPHIA, PA.		
749	Echo Phosphate,	L. A. Steigerwalt, Sittlers,
750	{Swift Sure Guano for Tomatoes, Truck and Corn,	L. A. Steigerwalt, Sittlers,
183		W. E. Erwin, Somerton,
963		Richard Fogle, Hecktown,
182		W. E. Erwin, Somerton,
434	{Swift Sure Super Phosphate for Tobacco & General Use,	Frank Burkholder, Lititz,
SCOTT FERTILIZER CO., ELKTON, MD.		
1126	Scott's Ammoniated Base,	J. W. Brunner, Belfry,
61	{Scott's Special Grain Grower,	W. G. Mellinger & Bros., West Willow, R. No. 1,
747	{	Nathan Bollinger, Palmerton, R. D.,
SWACK'S FERTILIZER WORKS, INC., DUBOIS, PA.		
601	{Swack's General Crop Grower,	R. H. Holmes, Mt. Jewett,
76		Sanford Runniger, Franklin,
704		C. F. Wills & Co., Parnassus,
603		R. H. Holmes, Mt. Jewett,
77	{Swack's Grain & Corn,	Sanford Runniger, Franklin,
703	{Swack's Potato & Truck,	C. F. Wills & Co., Parnassus,
839		Union Hdware Co., Mifflinburg,
1441		Hilner Hoover Hdware Co., DuBois,
1039		Union Hdware Co., Mifflinburg,
SWIFT & CO., BALTIMORE & CLEVELAND.		
249	Swift's Pure Ammoniated Bone Phosphate,	E. L. Smith & Co., Union City,
1377	Swift's Pure Diamond "C" Grain Fertilizer,	S. F. Rarig, Catawissa,
1455	Swift's Pure Long Measure Brand,	L. W. Danehower, Southampton,
195	Swift's Pure Red Steer,	Thos. Haines & Co., Malvern,
197	{Swift's Pure Special Corn Grower,	Thos. Haines & Co., Malvern,
1163	{Swift's Pure Special Formula "A,"	M. O. Stewart, Indiana,
1007		H. W. Rehmeier, Turn Pike,
1174		M. O. Stewart, Indiana,
1175		M. O. Stewart, Indiana, R. No. 4,
342	{Swift's Pure Special Formula "B,"	J. A. Blough, Hollsopple, R. No. 1,
851	{Swift's Pure Special Formula "C,"	A. M. Grove & Co., Medley Creek Forks, ..
I. P. THOMAS & SONS CO., PHILADELPHIA, PA.		
1492	Thomas' 4% Organic Fertilizer,	T. O. Bachman, Hellertown,
527	{Thomas' 1% Organic Fertilizer,	T. M. Griffith & Co., Downingtown,
119		M. F. Waser, York, R. No. 7,
772		H. S. Amazon, Edinboro,
120		M. F. Waser, York, R. No. 7,
774	{Thomas' Wheat & Corn Fertilizer,	H. S. Amazon, Edinboro,
F. W. TUNNELL & CO., INC., PHILADELPHIA, PA.		
489	1916 Excelsior Phosphate,	H. W. Van Artsdalen, Titusville,
484	1916 Fish Manure,	H. W. Van Artsdalen, Titusville,
481	1916 10% Guano,	H. W. Van Artsdalen, Titusville,
492	1916 No. 1 Potato & Truck Manure,	H. W. Van Artsdalen, Titusville,
959	1916 No. 2 Potato & Truck Manure,	J. A. Yost, Ringtown,
1468	1916 Potato & Vegetable Manure,	R. C. Fairlamb & Son, Brandywine Summit, ..
490	1916 Raw & Acidulated Animal Compound,	H. W. Van Artsdalen, Titusville,
J. E. TYGERT CO., BY THE AM. AG. CHEM. CO., NEW YORK.		
174	{Ammoniated Fertilizer "A,"	Harry McNair, Mechanicsville,
128		Chas. Maurer, Hepler,
882		C. B. Tyler, Messhopp,
177		Harry McNair, Mechanicsville,
139	{Ammoniated Fertilizer "A. A.,"	Chas. Maurer, Hepler,
284	Ammoniated Fertilizer "A. A. A.,"	C. B. Tyler, Messhopp,
173		Harry McNair, Mechanicsville,

†Composite sample.

IDULATED FERTILIZERS—Continued.

Moisture in 100 pounds.	Phosphoric Acid in 100 Pounds.					Nitrogen in 100 Pounds.					Selling price of 2,000 pounds at point of selection.
	Available.		Insoluble.	Total.		Water soluble.	Available.	Inactive—insoluble.	Total.		
	Found.	Guaranteed.		Found.	Guaranteed.				Found.	Guaranteed.	
4.73	10.83	7.00	2.73	13.56	10.00	.59	1.24	b.49	1.73	1.23	21.00
6.16	11.79	8.00	2.86	14.15	10.00	1.25	1.66	a.21	1.87	1.65	22.00
6.38	11.68	9.00	1.29	12.96	12.00	1.80	2.99	a.28	3.27	3.29	24.00
											22.00
											31.00
											32.00
8.09	12.09	12.00	2.73	14.82	.....	1.04	1.45	a.27	1.73	1.65	25.00
7.26	11.72	10.00	2.13	13.85	.....	.76	1.06	b.33	1.39	.83	19.50
										
8.12	10.32	10.00	1.91	12.23	11.00	.78	1.22	b.34	1.56	1.65	25.00
											22.50
											26.00
											21.75
5.22	10.92	10.00	.48	11.40	11.00	.39	.63	a.15	.78	.85	19.50
5.43	12.75	10.00	2.60	15.35	11.00	1.43	2.53	a.72	3.24	3.29	22.00
											23.00
											35.00
4.64	11.05	10.00	2.78	13.83	11.00	.79	1.67	a.54	*2.23	2.47	27.50
7.02	12.08	10.00	.47	12.55	.....	.57	.79	b.24	1.03	.82	22.00
4.32	8.01	8.00	.87	8.88	.....	.23	.39	c.29	*.63	.32	18.50
4.90	9.41	9.00	1.15	10.56	.....	.33	1.09	b.55	1.64	1.65	26.00
3.95	8.76	8.00	1.72	10.48	.....	.59	.80	b.30	*1.10	1.65	22.00
6.35	10.81	10.00	1.75	12.56	.....	.69	1.23	b.71	1.94	1.65	23.00
											24.50
6.25	8.97	8.00	.80	9.77	.....	1.17	2.31	b1.01	3.32	3.29	27.00
7.57	*12.61	14.00	1.75	14.36	.....	.57	1.15	b.44	1.59	1.65	26.50
7.36	12.28	12.00	1.26	13.52	.....	.87	1.36	b.53	1.89	1.65	23.00
											23.25
4.88	11.57	10.00	1.37	12.94	10.50	2.75	3.47	a.20	3.67	3.25	30.00
6.66	10.11	10.00	.77	10.88	10.50	.67	.91	b.21	1.13	.82	19.00
											19.00
											22.00
7.44	10.11	10.00	1.38	11.49	10.50	1.11	1.61	a.27	1.88	1.65	22.00
											26.00
7.01	7.54	6.00	1.30	8.84	7.00	.49	.73	c.33	1.11	.82	18.90
10.63	10.84	10.00	2.17	12.31	11.00	.55	.92	b.50	*1.43	1.64	26.10
9.21	5.60	4.00	.10	5.60	5.00	6.84	6.86	a.37	*7.28	8.23	49.50
6.59	11.39	10.00	1.35	12.74	11.00	1.67	2.26	b.57	*2.83	3.30	33.80
9.42	11.22	10.00	1.34	12.56	11.00	1.32	1.83	b.46	*2.29	2.46	26.00
10.44	11.02	10.00	1.29	12.31	11.00	.59	1.06	b.54	1.60	1.64	23.00
6.30	12.99	10.00	7.36	20.35	15.00	1.13	1.55	a.19	1.74	1.64	27.90
7.68	10.97	10.00	1.12	12.09	11.00	.93	1.23	a.17	1.40	.82	19.00
											19.00
											22.00
8.45	10.60	10.00	.99	11.59	11.00	.98	1.43	a.21	1.64	1.65	22.00
											24.00
9.51	11.17	10.00	1.34	12.51	11.00	1.55	2.16	b.43	2.64	2.47	26.90

a, b, c. Characters indicating the proportions of insoluble nitrogen that is inactive, a=25 or more; b=25 to 35; c=35 or less.

*Constituent falls below guaranty.

DISSOLVED BONE AND OTHER AC

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
THE WOOLDRIDGE FERTILIZER CO., BALTIMORE, MD.		
1395	Wooldridge's Special No. 2,	Grant Johnson, Millville,
351	Virginia Belle,	Jonathan Lambert, Stoyestown, R. No. 3,
ROBERT A. WOOLDRIDGE CO., BALTIMORE, MD.		
145	{ Wooldridge's Old Fidelity Phosphate, ... }	James M. Scott, Montoursville, R. No. 1,
995		Geo. Austin, Stewartstown,
YORK CHEMICAL WORKS, YORK, PA.		
113	{ Dempwolf's Black Cross,	Geo. W. Livingston, Hellam,
44		H. Rea, Peachbottom,
458	{ Dempwolf's Codorus Brand,	Maurice Leonard, McAlisterville,
1360		Enos H. Horst, Chambersburg,
1137	{ Dempwolf's Corn & Oats,	Thos. Haines, Malvern,
45		H. Rea, Peachbottom,
1110	{ Dempwolf's Potato & Truck,	C. A. Will, Rockwood, R. No. 2,
669		W. F. Gnagey, Berlin, R. No. 2,
812	{ Dempwolf's Prosperity,	Nathan Bittner, Germansville, R. No. 1,
1092		Edw. F. Bracken, Paoli,
831	{ Dempwolf's R. B. Special,	F. S. Balliet, Lehighton, R. D.,
39		Brown & Shoemaker, Quarryville,
664	{ Dempwolf's Red Cross,	Nathan Bittner, Germansville,
661		Nathan Bittner, Germansville,
669	{ Dempwolf's Royal Mixture,	Langford Bros. Compass,
1112		Thos. Haines Co., Malvern,
1005	{ Dempwolf's Top Dresser,	F. H. Shenberger, Red Lion, R. No. 1,
663		Nathan Bittner, Germansville,
1136		C. A. Will, Rockwood, R. No. 2,
389		Geo. H. Duttera, Duttera,
42		Brown & Shoemaker, Quarryville,
662		Nathan Bittner, Germansville, R. No. 1,
55		Chas. Witmer, Quarryville,

†Complete sample.

IDULATED FERTILIZERS—Continued.

Moisture in 100 pounds.	Phosphoric Acid in 100 Pounds.					Nitrogen in 100 Pounds.					Selling price of 2,000 pounds at point of selection.
	Available.		Insoluble.	Total.		Water soluble.	Available.	Inactive-insoluble.	Total.		
	Found.	Guaranteed.		Found.	Guaranteed.				Found.	Guaranteed.	
3.90	5.47	8.00	.61	9.08	8.50	.86	1.05	a.06	1.15	1.03	20.50
6.15	8.24	7.00	.47	8.71	7.50	.40	.54	b.20	.74	.63	18.00
8.74	10.26	10.00	1.90	12.16	11.00	1.29	1.56	a.15	1.71	1.65	{ 22.50
4.12	8.71	8.00	.55	9.26	8.50	.32	.47	c.33	.80	.82	{ 18.00 18.00
5.24	*8.67	10.00	.31	*8.98	10.50	.19	.30	c.28	.58	.41	{ 17.00 26.00
5.25	10.68	10.00	1.71	12.39	10.50	1.60	2.07	b.39	2.46	2.47	{ 24.50 30.55
2.72	9.05	8.00	.10	9.15	8.50	2.66	3.16	b.67	*3.82	4.10	{ 30.00 24.00
5.48	12.61	12.00	1.16	13.77	12.50	1.26	1.50	b.22	1.72	1.65	{ 23.00
6.30	12.66	10.00	.64	13.30	10.50	.83	1.37	b.52	1.96	2.06	{ 31.00 23.00
5.42	10.63	10.00	.51	11.12	10.50	.75	.89	c.32	1.22	1.23	{ 20.00 20.00
.....	10.04	10.00	.89	10.93	10.50	1.10	1.33	b.25	1.58	1.65	{ 20.90 22.50
6.12	7.63	7.00	.15	7.78	7.50	3.27	4.13	b1.35	*5.48	5.74	{

a, b, c. Characters indicating the proportion of insoluble nitrogen that is inactive: a=2/5 or more; b=2/5 to 3/5; c=3/5 or less.

*Constituent falls below guaranty.

ACIDULATED

Furnishing

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
	AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK.	
421	†Apex Acid Phosphate,	H. F. Gump & Son, Everett,
824		Jos. A. Gass, Sunbury,
152		Reuben Person, Montgomery,
81		T. E. Bolton, Cochran,
846	†16% Acid Phosphate,	Newton Gouder, Boswell, R. No. 1,
1371	Susquehanna Dissolved S. C. Rock,	James Jacobs, York Springs,
579	Susquehanna High Grade Super Phosphate,	H. F. Moyer, Campbelltown,
1024		Puckey & Co., Rock Hill Furnace,
790	†Wheeler's High Grade Acid Phosphate,	B. W. Russell, Enon Valley,
1082		Wm. I. Brown, Mill Creek, R. D.,
791	Wheeler's Peerless Acid Phosphate,	B. W. Russell, Enon Valley,
	AMERICAN FERTILIZER CO., BALTIMORE, MD.	
693	†10% Acid Phosphate,	J. H. Neidigh, State College,
856		Burt Hoff, Spring Grove,
670		N. R. Yost, Myerstown,
63	†American High Grade Acid Phosphate,	Jones Eavenson, Christiansa,
682		J. H. Neidigh, State College,
	ARMOUR FERTILIZER WORKS, BALTIMORE, MD.	
519	†Acid Phosphate, 16%,	Passmore & Co., Nottingham,
376		Orwell Grange, Orwell,
700		A. M. Ashe, Kittanning, R. No. 2,
253		D. G. Stuft, Stoyestown,
18	†Star Phosphate, 14%,	H. W. Burg, East Prospect,
701		A. M. Ashe, Kittanning,
	BALTIMORE FERTILIZER CO., BALTIMORE, MD.	
842	Honest Acid Phosphate,	J. N. Lightner, Gettysburg,
	BAUGH & SONS CO., PHILADELPHIA, PA.	
52	†Baugh's 16% Acid Phosphate,	C. N. Frits, Quarryville,
3		Brillinger & Swarts, Smigsville,
141		H. W. Paul, Leck Kill,
	BOWKER FERTILIZER CO., BOSTON, MASS.	
789	†Bowker's 16% Acid Phosphate,	G. L. Rommel, Enon Valley,
911		Robt. Smith, Centre Hall,
	CENTRAL CHEMICAL CO., THOMAS FERTILIZER WORKS, HAGERSTOWN, MD.	
542	†C. C. C. Dissolved Phosphate,	E. W. Rupp, Shiremanstown,
810		H. E. Barclay, Somerset, R. No. 4,
	COE MORTIMER CO., NEW YORK.	
166	†E. Frank Coe's High Grade Soluble Phosphate,	Adolf Boettinger, Danville,
124		Chas. Schoffstall, Valley View,
374		C. E. Estabrook, Rummerfeld,
818		Adolf Boettinger, Danville,
375	†E. Frank Coe's 16% Super Phosphate,	C. E. Estabrook, Rummerfeld,
1151		P. G. Conn, Point Marion,
	COLUMBIA GUANO CO., BALTIMORE, MD.	
1386	Columbia 14% Acid Phosphate,	M. P. Whitenight, Bloomsburg,

†Composite sample.

ROCK PHOSPHATE.

Phosphoric Acid.

Moisture in 100 lbs.	Phosphoric Acid in 100 lbs.					Selling price of 2,000 pounds at point of solution.
	Available.		Insoluble.	Total.		
	Found.	Guaranteed.		Found.	Guaranteed.	
4.18	11.18	10.00	.65	11.78	11.00	17.25
						16.00
8.40	16.83	16.00	.87	17.70	17.00	18.50
						20.00
4.89	15.77	14.00	.65	16.42	15.00	19.00
10.67	16.28	16.00	.75	17.03	17.00	18.25
						16.00
9.84	17.22	16.00	.61	17.83	17.00	20.00
						19.50
6.87	14.06	14.00	1.06	15.14	15.00	17.00
						18.50
8.32	11.37	10.00	1.15	12.52	11.00	17.00
						14.75
6.08	16.01	16.00	1.20	17.21	17.00	20.00
						17.00
						19.00
8.02	17.19	16.00	.28	17.57	16.50	19.00
						17.70
8.03	14.48	14.00	.56	15.04	14.50	22.00
						20.00
						18.00
						21.00
9.57	15.06	14.00	.13	15.19	15.00	17.50
11.11	16.96	16.00	.51	17.47	.....	18.00
						18.00
						18.00
8.99	16.11	16.00	.70	16.81	17.00	20.00
						18.50
8.96	16.12	16.00	.55	16.67	.....	19.00
						18.00
7.18	14.52	14.00	.98	15.50	15.00	16.50
						17.60
						16.70
9.88	15.85	16.00	1.36	17.21	17.00	17.50
						19.00
						20.00
6.54	14.32	14.00	1.07	15.39	14.50	19.10

*Constituent falls below guaranty.

ACIDULATED ROCK

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
	CONSUMERS CHEMICAL CORPORATION, NEW YORK.	
894	†Consumer's Pure Sure Acid Phosphate,	E. H. Hayes, Clintondale,
67		
1064	†Consumer's High Grade Acid Phosphate,	Allan Walton, Christiansa,
461		W. B. Goodhart, Catawissa,
367		Eli Martin, New Holland,
896		T. M. Allyn, Nickols, N. Y.,
		E. H. Hayes, Clintondale,
	HENRY COPE & CO., LINCOLN UNIVER- SITY, PA.	
517	Acid Phosphate,	L. Whitaker, Oxford,
	JOSIAH COPE & CO., BALTIMORE, MD.	
804	High Grade Super Phosphate,	Ed. H. Miller, Somerset, R. No. 4,
	W. S. FARMER & CO., NEW YORK.	
310	W. S. Farmer & Co.'s High Grade Super Phosphate.	J. N. Duthree, New Oxford,
	FARMERS FERTILIZER & FEED CO., WESTMINSTER, MD.	
885	Acid Phosphate,	C. C. Brown, East Berlin,
	FARMERS FERTILIZER WORKS, ELIZA- BETH TOWN, PA.	
1270	†Acid Phosphate,	J. D. Graybill & Son, Belleville,
1286		
	GRIFFITH & BOYD CO., BALTIMORE, MD.	
522	†High Grade Acid Phosphate,	R. L. Myers, Dickinson,
201		
864		S. K. Chambers & Bro., West Grove,
		Anderson Bro., New Park,
	S. M. HESS & BRO., PHILADELPHIA, PA.	
429	†High Grade Acid Phosphate,	Frank Reighard, Bedford, R. No. 1,
227		
467	Special High Grade Acid Phosphate,	Moses Weaver, Johnstown, R. No. 4,
584		
1018		Wm. Peffenberger, Mifflintown,
		H. M. Hostetter, Campbelltown,
		Ira Price, Everett, R. D.,
	THE HUBBARD FERTILIZER CO., BALTI- MORE, MD.	
406	†Hubbard's 16% Phosphate,	Biglerville Warehouse Co., Biglerville,
1012		
404	†Hubbard's 12% Phosphate,	E. H. Hartle, Osterburg,
369		
462		Biglerville Warehouse Co., Biglerville,
		C. H. Schmucker, Friedens,
		W. H. Steber, McAllisterville,
	M. P. HUBBARD & CO., INC., BALTIMORE, MD.	
826	†Hubbard's Dissolved Phosphate,	Jos. A. Gass, Sunbury,
379		
862	Hubbard's Soluble Phosphate,	Biglerville & Keldar, New Albany,
300		
		J. P. Schuchart, New Freedom,
		M. J. Sheffer, Hanover,
	INTERNATIONAL AGRICULTURAL COR- PORATION, BUFFALO FERTILIZER WORKS, BUFFALO, N. Y.	
1231	Buffalo Dissolved Phosphate,	O. Wellett & Ferwelliger, Galetton,
	JARECKI CHEMICAL CO., SANDUSKY, O.	
782	C. O. D. Phosphate,	Chas. C. Good Co., North Girard,
	KEYSTONE GRANGE EXCHANGE, MANS- FIELD, PA.	
324	†16% Acid Phosphate,	I. E. Artz, Sec., Hegins Grange, Hegins, }
338		
		J. A. Blough, Hollsapple, R. No. 1, }

†Composite sample.

PHOSPHATE—Continued.

Moisture in 100 lbs.	Phosphoric Acid in 100 lbs.					Selling price of 2,000 pounds at point of solution.
	Available.		Insoluble.	Total.		
	Found.	Guaranteed.		Found.	Guaranteed.	
7.93	15.45	14.00	1.06	16.51	15.00	18.00 23.00 17.00 19.00 19.00 19.00
8.80	17.02	16.00	.83	17.85	17.00	
10.65	15.20	14.00	.97	16.17	.....		16.00
11.16	16.44	16.00	.41	16.85	17.00	18.50
11.68	16.10	16.00	1.03	17.12	17.00	18.00
10.84	14.49	14.00	.89	*15.38	16.00	.....
4.16	14.99	14.00	.55	15.53	.....	13.50 16.00
10.00	15.80	14.00	.68	16.48	15.00		..... 18.00 17.50
8.62	14.49	14.00	1.16	15.65	15.00	..... 19.00
10.35	16.33	16.00	.79	17.12	17.00	..... 19.50
12.59	17.02	16.00	.13	17.20	17.00	19.00 20.50 17.00 18.00
6.50	14.87	12.00	1.44	16.31	13.00	
10.01	16.57	16.00	.45	*17.02	17.50		19.00 19.00 17.50 19.00
7.61	14.16	14.00	1.41	15.57	15.50	.....
9.07	*11.11	14.00	.81	*11.94	.....	19.00
13.30	14.61	14.00	.60	15.21	15.00	19.00
9.47	16.45	16.00	1.21	17.66	17.00	17.50 17.00

*Constituent falls below guaranty.

ACIDULATED ROCK

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
	FREDERICK LUDLAM CO., BALTIMORE, MD.	
164	Ludlam's Cecrops Fertilizers Dissolved Phosphate.	B. L. Slupman, Muncy, R. No. 4,
166	Ludlam's Cecrops Fertilizers H. G. Dissolved Phosphate.	B. L. Slupman, Muncy, R. No. 4,
	LANCASTER BONE FERTILIZER CO.	
388	Grange Special,	Harry Hoffnagle, New Oxford,
	LANCASTER CHEMICAL CO., LANCASTER, PA.	
512	{No. 8 Acid Phosphate,	H. M. Long, Oxford,
523		Amos Gilbert, Quarryville,
540		J. D. Buckhart, Newville,
	NASSAU FERTILIZER CO., NEW YORK.	
430	{High Grade Super Phosphate,	J. H. Brown, Loysburg,
540		Wm. Mumma, Mechanicsburg,
	NITRATE AGENCIES CO., NEW YORK.	
948	{High Grade Acid Phosphate, 16%,	C. E. Bronson Loyallville,
968		Harry Lear, Pocono Grange, Tannersville,
	G. OBER & SONS CO., BALTIMORE, MD.	
384	Dissolved Phosphate, 14%,	D. Blocker & Co., Gettysville,
	PATAPSCO GUANO CO., BALTIMORE, MD.	
387	{Battle Ax Phosphate,	J. N. Hersh, New Oxford,
478		J. S. Horley, Thompsonstown, ..
479		J. S. Horley, Thompsonstown,
361		D. Ringrose, Cadis,
	PATAPSCO DISSOLVED PHOSPHATE,	
	PATAPSCO PURE DISSOLVED S. C. PHOSPHATE,	
	PIEDMONT MT. AIRY GUANO CO., BALTIMORE, MD.	
1076	{Piedmont 14% Acid Phosphate,	Long & Miller, Liverpool,
890		G. R. Thompson, Gettysburg,
1185	{Piedmont 12% Acid Phosphate,	P. A. Brugh, Rockwood,
65		Harry Mullen, Christiansa,
1078		Long & Miller, Liverpool,
	PITTSBURGH PROVISION & PACKING CO., PITTSBURGH, PA.	
360	Acid Phosphate,	J. Z. Rhoads, Club Agt., Stoyestown, R. 1,
	POLLOCK FERTILIZER WORKS, BALTIMORE, MD.	
346	{The Pollock Fertilizer Co. High Grade	W. F. Shaulis, Hollsopple, R. No. 4,
306		J. N. Keltz, Littlestown,
424	Super Phosphate.	Jno. L. Borts, Bedford,
	RASIN MONUMENTAL CO., BALTIMORE, MD.	
1258	Rasin's Sea Wall Special,	S. C. Weber, Boalsburg,
	READING BONE FERTILIZER CO., READING, PA.	
1338	16% Acid Phosphate,	Geo. Richards, Mariondale,
	ROBERT A. REICHARD, ALLENTOWN, PA.	
635	Acid Phosphate,	Jno. Kuntzman, Hellertown,
	F. S. ROYSTER GUANO CO., BALTIMORE, MD.	
85	{Royster's H. G. 16% Acid Phosphate,	W. C. Work & Son, Cochranston,
46		Merton S. Haines, Pleasant Grove,
159		Myers & Slonaker, Hughesville,
86		W. C. Work & Son, Cochranston,
49		Merton E. Haines, Pleasant Grove,
158	{Royster's 14% Acid Phosphate,	Myers & Slonaker, Hughesville,

†Composite sample.

PHOSPHATE—Continued.

Moisture in 100 lbs.	Phosphoric Acid in 100 lbs.					Selling price of 2,000 pounds at point of solution.
	Available.		Insoluble.	Total.		
	Found.	Guaranteed.		Found.	Guaranteed.	
9.05	14.23	14.00	1.02	15.25	15.00	.....
11.37	16.32	16.00	.77	17.10	17.00	.....
9.53	17.10	16.00	.42	17.52	.....	.....
9.70	14.01	14.00	.41	*14.42	15.00	{ 13.00 15.85
8.95	16.47	16.00	.73	17.20	17.00	} 18.50 18.50
9.24	17.20	16.00	.19	17.39	17.00	} 19.00 25.00
6.94	15.62	14.00	.50	16.12	15.00	17.00
5.49	12.56	12.00	.70	13.26	13.00	} 13.50 16.80
8.97	*16.78	18.00	.32	*17.05	19.00	20.50
6.99	14.17	14.00	.77	14.94	15.00	14.50
8.97	15.25	14.00	.09	15.34	.....	{ ..... 17.25
8.77	12.64	12.00	.10	12.74	.....	{ ..... 17.50 16.50
6.45	12.50	11.00	.70	13.20	12.00	17.60
8.27	17.22	16.00	.22	17.46	17.00	{ 18.50 18.00 19.00
4.73	10.54	10.00	.89	11.45	11.00	16.50
6.61	17.15	16.00	1.82	18.97	17.00	19.00
4.04	14.84	14.00	.23	15.19	15.00	.....
7.53	17.29	16.00	.50	17.79	16.50	{ 21.25 17.75 21.00
4.33	14.64	14.00	.99	15.63	14.50	20.25 16.75 19.50

*Constituent falls below guaranty.

ACIDULATED ROCK

Sample number.	Manufacturer and Brand.	From Whom Sample Was Taken.
784	SMITH'S AGRICULTURAL CHEMICAL CO., COLUMBUS, O. Smith's 16% Acid Phosphate,	C. R. Forbs, Albion,
248	SWIFT & CO., BALTIMORE, MD.	
196	{ Swift's Pure Garden City Phosphate, ..	{ E. L. Smith & Co., Union City,
720	{ Swift's Pure High Grade Acid Phosphate, ..	{ Thos. Haines & Co., Malvern,
1185	{	{ A. H. Knauff, Harmony,
	{	{ M. C. Stewart, Indiana,
	SWACK'S FERTILIZER WORKS, DUBOIS, PA.	
705	Swack's Acid Phosphate, 16%,	C. T. Wills & Co., Parnassus,
	I. P. THOMAS & SONS CO., PHILADEL- PHIA, PA.	
773	{ 16% Acid Phosphate,	{ H. S. Amazon, Edinboro,
1023	{	{ C. E. Starr, Three Springs,
	TUSCORARA FERTILIZER CO., BALTI- MORE, MD.	
1485	Acid Phosphate, 14%,	L. B. Longanecker, Greensboro,
	J. E. TYGERT CO., by AM. AG. CHEM. CO., NEW YORK.	
558	{ 18% Acid Phosphate,	{ J. Brenneman, Lisburn,
383	{ 16% Acid Phosphate,	{ C. B. Tyler, Messhoppen,
559	{	{ J. Brenneman, Lisburn,
	VIRGINIA CAROLINA CHEM. CO., RICH- MOND, VA.	
409	V. O. C. Co.'s 16% Acid Phosphate,	G. E. Knisley, Reynoldsville,
	WARREN FERTILIZER CO., WARREN, PA.	
1200	Warren Soluble Phosphate,	Pickett's Hardware Co., Warren,
	WASHINGTON, ALEXANDER & COOK CO., CHARLESTOWN, W. VA.	
399	W. A. & C.'s Acid Phosphate,	E. S. Kelly, Gettysburg,
	ROBT. A. WOOLDRIDGE CO., BALTIMORE, MD.	
431	{ Wooldridge's Florida Acid Phosphate, ..	{ Adam Beach, New Enterprise,
146	{	{ James M. Scott, Montoursville,
474	{	{ J. M. Peterson, Honey Grove,
	YORK CHEMICAL WORKS, YORK, PA.	
107	{ Dempwolf's Superphosphate,	{ Dover Farmers Coop. Assc., Dover,
56	{	{ Charles Witmer, Quarryville,
459	{	{ Maurice Leonard, McAllisterville,

*Constituent falls below guarantv

PHOSPHATE—Continued.

Moisture in 100 lbs.	Phosphoric Acid in 100 lbs.					Selling price of 2,000 pounds at point of solution.
	Available.		Insoluble.	Total.		
	Found.	Guaranteed.		Found.	Guaranteed.	
6.89	16.96	16.00	.41	17.37	.....	21.00
7.70	15.11	14.00	.74	15.85	.....	20.00
8.42	16.41	16.00	.83	17.24	.....	18.00
9.25	15.90	16.00	.88	*16.78	17.00	21.00
11.13	17.09	16.00	.68	17.77	16.50	20.00
9.25	15.19	14.00	.24	15.43	14.50	18.50
9.97	18.75	18.00	.42	19.17	19.00	.....
14.57	16.21	16.00	.51	*16.72	17.00	20.00
10.74	16.86	16.00	.82	17.68	17.00	.....
10.03	16.75	16.00	.89	17.64	.....	19.80
9.75	15.21	14.00	1.26	16.47	15.00	22.00
8.62	14.57	14.00	1.06	15.63	15.00	17.00
11.40	16.40	16.00	.15	16.55	16.50	18.00

†Composite sample.

GROUND BONE

Furnishing Phosphoric

Sample No.	Manufacturer and Brand.	From Whom Sample Was Taken.
1859	THE AHREN FERTILIZER CO., LORANE, PA. Pure Bone Meal,	H. Ahren, Lorane,
251	AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK.	Union Coal & Supply Co., Union City,
728	{†Fine Ground Bone,	{Thompson & Glenn, Butler,
1082	High Grade Ground Bone,	Harvey L. Moses, Chester Springs,
914	Pure Raw Bone,	H. L. Stults & Bro., Altoona,
98	ARMOUR FERTILIZER WORKS, CHICAGO, ILL. Bone Meal, 3-22,	United Hardware & Supply Co., Titusville, ..
1289	ASSOCIATED CHEMICAL CO., HAGERS-TOWN, MD. Fine Ground Bone,	John W. Kline, Catawissa, Pa.,
256	BAUGH & SONS CO., PHILADELPHIA, PA.	Lake Shore Fruit Co., North East,
58	{Baugh's Pure Steamed Bone,	{C. W. Fritz, Quarryville,
347	{Baugh's Raw Bone Meal, Warranted Pure	{J. S. Rhoads, Stoyestown, R. No. 1,
508	{Baugh's Raw Bone Meal, Warranted Pure	{Harvey G. Shortlidge, Kelton,
106	{Baugh's Raw Bone Meal, Warranted Pure	{Geo. W. Holtzinger, Red Lion,
687	{Baugh's Raw Bone Meal, Warranted Pure	{J. G. Brubaker, Richfield,
1223	BOWKER FERTILIZER CO., NEW YORK. Bowker's Fresh Ground Bone,	J. A. Stall & Co., Kane,
481	THE DUNGAN FERTILIZER CO., DOYLES-TOWN, PA. Bone Flour,	Dungan Fertilizer Co., Doylestown,
258	GRIFFITH & BOYD CO., BALTIMORE, MD.	Willis C. Herr, Strasburg,
520	{†Pure Fine Ground Bone Meal,	{Passmore & Co., Nottingham,
254	Soft Ground Bone Meal,	{Willis C. Herr, Strasburg,
1467	HAFLEIGH & CO., PHILADELPHIA, PA. Pure Raw Bone Meal,	S. C. Walker & Co., Chadds Ford Junction, ..
1243	INTERNATIONAL AGRICULTURAL COR-PORATION, BUFFALO FERTILIZER WORKS, BUFFALO, N. Y. Buffalo Bone Meal,	Victor Lantz, Mt. Jewett, R. D.,
1464	MARTIN FERTILIZER CO., PHILADEL- PHIA, PA. Martin's Pure Ground Bone,	C. R. Kirk & Co., Oxford,
1274	HENRY F. MICHELL CO., PHILADELPHIA, PA. Michell's Fine Ground Bone Meal,	Mr. Quinn, Harrisburg,
1408	THE MILLER FERTILIZER CO., BALTI-MORE, MD. Ground Bone,	Grant Johnson, Millville,

†Composite sample.

FERTILIZERS.

Acid and Nitrogen.

Moisture in 100 pounds.	Mechanical Analysis.		Chemical Analysis.				Selling price of 2,000 pounds at point of selection.
	Diameter less than 1-50 inch. "Fine."	Diameter greater than 1-50 inch. "Coarse."	Phosphoric Acid.		Nitrogen.		
			Found.	Guaranteed.	Found.	Guaranteed.	
7.18	27	73	23.63	22.34	4.41	4.19	35.00
3.63	61	39	23.55	22.88	2.45	2.47	{ 34.00 24.00 29.50 50.00
4.28	40	60	24.96	20.59	3.15	3.23	
7.07	41	59	*21.12	21.51	3.72	3.70	
5.02	60	40	*20.58	22.00	2.57	2.47	35.00
5.76	50	50	22.83	23.00	2.97	2.87	35.50
8.89	49	51	23.19	25.00	1.74	1.65	{ 33.00 33.00 32.50 40.00 39.50
7.12	47	53	21.31	21.50	3.76	3.70	
3.50	58	42	23.00	22.38	2.51	2.47	
6.64	45	55	*12.44	20.00	*2.43	3.70	35.00
6.84	42	58	*19.91	22.00	3.81	3.30	{ 40.00 40.00 38.00
3.92	59	41	14.67	11.00	2.86	2.50	
8.82	50	50	*24.41	25.84	3.78	3.75	40.00
4.16	56	44	22.74	22.00	2.53	2.50	35.00
6.70	50	50	25.90	22.90	2.16	1.65	34.00
7.39	50	50	17.76	16.49	2.60	2.47	.....
4.52	58	42	23.51	13.92	2.66	2.47	37.00

*Constituent falls below guaranty.

GROUND BONE

Sample No.	Manufacturer and Brand.	From Whom Sample Was Taken.
89 733 734	PITTSBURGH PROVISION & PACKING CO., PITTSBURGH, PA. } †Pure Raw Bone Meal, } No. 1 Pure Raw Bone Meal,	W. J. Gibson, Titusville, I. W. Scott Co., Pittsburgh, I. W. Scott Co., Pittsburgh,
1463	PUGH & LYONS, OXFORD, PA. Ground Raw Bone,	C. R. Kirk & Co., Oxford,
1108 958	READING BONE FERTILIZER CO., READ- ING, PA. Pure Bone Meal, Pure Raw Bone,	W. W. Moses, Exton, Sugar Loaf Grange, Conyngham,
1416	REICHARD HIDE AND TALLOW CO., ASH- LAND, PA. Pure Ground Bone,	Fred Craig, Catawissa,
169 759	F. S. ROYSTER GUANO CO., BALTIMORE, MD. Royster's Fine Ground Bone Meal, Royster's Pure Raw Bone Meal,	Wm. C. Ball, Media, Milton Miller, R. No. 3, Tamsqua,
1068	F. W. TUNNELL & CO., PHILADELPHIA, PA. Pure Ground Bone,	W. B. Passmore, Embreeville,

†Composite sample.

PHOSPHATE—Continued.

Moisture in 100 pounds.	Mechanical Analysis.		Chemical Analysis.				Selling price of 2,000 pounds at point of selection.
	Diameter less than 1-50 inch. "Fine."	Diameter greater than 1-50 inch. "Coarse."	Phosphoric Acid.		Nitrogen.		
			Found.	Guaranteed.	Found.	Guaranteed.	
7.10	30	70	*18.59	21.00	4.38	3.70	{ 32.00 23.00 31.00
5.52	48	52	22.06	22.00	3.56	3.70	
6.55	34	66	23.82	20.00	3.51	3.30	
3.07	50	50	20.25	18.00	3.91	2.46	26.00
5.73	46	54	21.92	18.00	3.30	3.23	26.00
7.86	3	97	*22.50	25.00	3.91	3.46	31.00
3.66	62	38	23.30	22.90	2.64	2.47	40.00
5.98	50	50	24.58	21.50	3.56	3.70	.....
4.56	50	50	29.12	23.00	*1.18	2.46	35.00

*Constituent falls below guaranty.

MISCELLANEOUS

Sample No.	Manufacturer and Brand.		From Whom Sample Was Taken.	
	AMERICAN AGRICULTURAL CHEMICAL CO., NEW YORK.			
513	Basic Lime Phosphate,		Mackey & Yerkes, Oxford,	
1298	†Ground Untreated Phosphate Rock,		B. F. Horting, Newport,	
1397	}†Nitrate of Soda,		A. R. Whitmoyer, Unityville,	
915			H. L. Stuts & Bro., Altoona,	
984			Wm. Weaver, Freemansburg,	
	ARMOUR FERTILIZER WORKS, BALTIMORE, MD.			
445	Ground Tankage, 7-20,		S. H. Snavelly, Manheim,	
	BAUGH & SONS CO., PHILADELPHIA, PA.			
506	†High Grade Tankage,		H. S. Shortlidge, Kelton,	
946			Thomas Garrison, Berwick,	
	FEDERAL CHEMICAL CO., COLUMBIA, TENN.			
930	}†Daybrake Tennessee Brown Phosphate {		C. S. Clark, Falls,	
869	Rock.		J. W. Rider, Bellwood,	
1062			E. Gerhart and Sons, Jonestown,	
	J. L. HUNTER & SONS, PITTSBURGH, PA.			
942	Exeter Tankage,		C. E. Bronson, Loyalville,	
	LEBANON FERTILIZER WORKS.			
1277	Levan's Animal Tankage,		W. A. Ballets, Dauphin,	
	MT. PLEASANT FERT. CO., MT. PLEASANT, TENN.			
250	}†Fine Ground Phosphate Rock,		E. L. Smith and Co., Union City,	
1387			H. B. Low and Son, Orangeville,	
	NITRATE AGENCIES CO., NEW YORK.			
502	}†Nitrate of Soda,		Frank B. Carrolls, Neshaminy,	
735			I. W. Scott Co., Pittsburgh,	
	PITTSBURGH PROVISION & PACKING CO., PITTSBURGH, PA.			
741	Nitrate of Soda,		Beckert's Seed Store, Pittsburgh,	
739	Pure Bone & Meat,		Geo. Renton & Co., Castle Shannon,	
	SWACK'S FERTILIZER WORKS, DUBOIS, PA.			
602	}†Swack's High Grade Tankage,		R. H. Holmes, Mt. Jewett,	
1171			I. W. Gibson, Indiana,	
	WITHERBEE SHERMAN & CO., PORT HENRY, N. Y.			
884	Barium Phosphate,		W. F. Bennett, Clifford,	

†Composite sample.

FERTILIZERS.

Moisture in 100 pounds.	Phosphoric Acid in 100 Pounds.					Potash in 100 Pounds.					Nitrogen in 100 Pounds.					Selling price of 2,000 lbs. at point of selection.
	Available.		Insoluble.	Total.		Present as Muriate.	Present as Sulphate.	Total.		Water Soluble.	Available.	Inactive Insoluble.	Total.			
	Found.	Guaranteed.		Found.	Guaranteed.			Found.	Guaranteed.				Found.	Guaranteed.		
4.04 .44 .89	13.22	13.00 ..... .....	..... ..... .....	15.03 *30.19 .....	..... 31.12 .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... 15.88	..... ..... 15.00	..... ..... ..... 22.00 { 12.85 14.75 80.00 75.00
6.95	9.18	9.28	.....	.....	.....	.....	1.93	3.56	b1.54	*5.10	5.76	34.84	
9.69	8.50	4.00	.....	.....	.....	.....	1.59	3.88	b1.64	*5.52	6.58	{ 36.00	
.67	*29.06	29.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	{ ..... 9.00 10.50	
3.10	17.03	13.60	.....	.....	.....	.....	1.84	3.47	b1.35	*4.82	6.60	32.00	
5.67	*6.31	9.74	.....	.....	.....	.....	1.43	2.38	b1.33	*3.71	5.78	35.00	
.51	31.40	29.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	{ 10.00 10.90	
.....	15.46	15.00	{ 64.00 80.00	
..47 6.96	*6.60	8.00	.....	.....	.....	.....	.87	5.93	a2.53	15.77 8.40	14.80 4.92	160.00 26.00	
7.40	14.20	12.00	.....	.....	.....	.....	1.37	4.36	a1.04	5.40	5.00	{ 36.50 40.00	
....	.67	.....	15.16	15.83	14.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	17.50

a, b, c. Characters indicating the proportions of insoluble nitrogen that is inactive. a=2-5 or more; b=2-5 to 3-5; c=3-5 or less.

*Constituent falls below guaranty.



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Commonwealth of Pennsylvania ,

DEPARTMENT OF AGRICULTURE .

BULLETIN NO. 223

PROCEEDINGS OF THE

Farmers' Annual Normal Institute

AND SPRING MEETING

OF THE

STATE BOARD OF AGRICULTURE

COMPILED BY
G. E. CAROTHERS, Director of Institutes



HELD AT HOTEL BERKSHIRE, READING, PA.,
MAY 23 TO 25, 1916

HARRISBURG, PA.:
WM. STANLEY RAY, STATE PRINTER
1916

Commonwealth of Pennsylvania

DEPARTMENT OF AGRICULTURE

BULLETIN NO. 283

PROCEEDINGS OF THE

Farmers'

Annual Normal Institute

AND SPRING MEETING

OF THE

STATE BOARD OF AGRICULTURE

COMPILED BY
C. E. CAROTHERS, Director of Institutes



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Pennsylvania. Dept of Agriculture 2-23-179



PREFACE

Commonwealth of Pennsylvania,
Department of Agriculture,
Harrisburg, Pa., June 15, 1916.

There is perhaps no source of information upon subjects relating to either practical or scientific agriculture that is so easily available as the Farmers' Institutes, and whatever adds to the efficiency of these institutes is of paramount importance. The hope of increasing their usefulness to the farmers of the State has led to the establishment of what is known as the Farmers' Normal Institute, in which all institute managers and lecturers of the State come together once a year for consultation and instruction.

In order that the instruction given at these institutes may be available to the greatest possible number, this Department publishes, in bulletin form, their proceedings, and so we send out the following bulletin, No. 283, containing the full proceedings of the Normal Institute held at Reading, Pa., May 23 to 25, 1916, in the hope that it may prove helpful upon the many farms and in the many farmhouses to which it may come.

C. E. PATTON,
Secretary of Agriculture.



LETTER OF TRANSMITTAL

Commonwealth of Pennsylvania,
Department of Agriculture,

Harrisburg, Pa., June 15, 1916.

Hon. C. E. Patton, Secretary of Agriculture:

Dear Sir: I have the honor to present herewith, bulletin of the Thirteenth Annual "Farmers Normal Institute," which was held at Reading, Pa., May 23 to 25, 1916.

Very respectfully,

C. E. CAROTHERS.
Director of Institutes.



MEMBERS

OF THE

Pennsylvania State Board of Agriculture

For the Year 1916.

Members Ex-officio

HON. MARTIN G. BRUMBAUGH, Governor.
 HON. HENRY HOUCK, Secretary of Internal Affairs.
 DR. N. C. SCHAEFFER, Superintendent of Public Instruction.
 DR. EDWIN ERLE SPARKS, President of the State College.
 HON. A. W. POWELL, Auditor General.
 HON. CHARLES E. PATTON, Secretary of Agriculture.

Appointed by the Governor

Term expires.

Mrs. Jean Kane Foulke, West Chester, Chester County,.....1917

Appointed by the Pennsylvania State Poultry Society

W. Theo. Wittman,.....Allentown,.....1917

Appointed by the Pennsylvania Bee-Keepers' Association

E. A. Welmer,.....Lebanon,1918

Elected by County Agricultural Societies

Adams,	A. I. Weidner,	Arendtsville, .....1918
Allegheny,	C. L. Hood,.....	Coraopolis, R. D.,.....1918
Armstrong,	S. S. Blyholder,.....	Kelly Station, .....1917
Beaver,	Walter C. Dunlap,.....	West Bridgewater, .....1917
Bedford,	Wm. F. Biddle,.....	Everett, .....1918
Berks,	H. G. McGowan,.....	Geiger's Mills, .....1919
Blair,	W. Frank Beck,.....	Altoona, .....1917
Bradford,	Louis Plollet,.....	Wysox, .....1919
Bucks,	B. Frank Wambold,....	Sellersville, .....1917
Butler,	Wm. H. Milliron,....	Marwood, .....1917
Cambria,	L. J. Bearer,.....	Hastings, .....1919
Cameron,.....	R. P. Hellman,	Emporium, .....1919
Carbon,	Edward Lienhard,	Mauch Chunk, .....1917

Elected by County Agricultural Societies—Continued.

			Term expires.
Centre,	John A. Woodward,...	Howard,	1918
Chester,	M. E. Conard,.....	Westgrove,	1918
Clarion,	J. H. Wilson,.....	Clarion,	1919
Clearfield,	T. L. Way,	Curwensville,	1919
Clinton,	Joel A. Herr,.....	Millhall,	1917
Columbia,	A. C. Creasy,	Bloomsburg, R. D.,.....	1919
Crawford,	W. F. Throop,.....	Espyville,	1918
Cumberland,			
Dauphin,	E. S. Keiper,.....	Middletown,	1917
Delaware,	Thos. H. Wittkorn,...	Media,	1917
Elk,	John G. Schmidt, ...	St. Marys,	1919
Erie,	D. Warren De Rosay, ..	Corry,	1919
Fayette,	John T. Smith,.....	Dunbar,	1919
Forest,			
Franklin,	J. P. Young,.....	Marion,	1917
Fulton,	Frank Ranck,	Hancock, Md.,	1919
Greene,			
Huntingdon,	George G. Hutchison, ..	Warrior's Mark,	1918
Indiana,	S. C. George,.....	West Lebanon,	1919
Jefferson,	Peter B. Cowan,.....	Brookville,	1919
Juniata,	Matthew Rodgers, ...	Mexico,	1918
Lackawanna,	Horace Seamans,	Factoryville,	1919
Lancaster,	J. Aldus Herr,.....	Lancaster,	1917
Lawrence,	Doris L. Fulkman, ...	New Wilfington,	1919
Lebanon,	Edward Shuey,	Annaville, R. D. 2,	1919
Lehigh,	P. S. Fenstermacher, ..	Allentown,	1918
Luzerne,	J. E. Hildebraat,.....	Dallas,	1918
Lycoming,	B. F. Kahler,	Hughesville,	1918
McKean,	E. A. Studholme,.....	Smethport,	1919
Mercer,	W. C. Black,.....	Mercer,	1917
Mifflin,	C. M. Smith,.....	Lewistown,	1919
Monroe,	F. S. Brong,.....	Saylorsburg,	1919
Montgomery,	John H. Schultz,.....	Norristown,	1917
Montour,	J. Miles Derr,.....	Milton, R. D.,	1919
Northampton,	C. S. Messinger,.....	Tatamy,	1918
Northumberland,	Wm. A. Fisher,	Milton, R. D.	1919
Perry,	Clark M. Bower,.....	Blain,	1919
Philadelphia,	David Rust,	Philadelphia,	1919
Pike,	B. F. Killam,.....	Paupack,	1918
Potter,			
Schuylkill,	John Shoener,	Orwigsburg,	1919
Snyder,			
Somerset,	Robert W. Lohr,.....	Boaswell,	1917
Sullivan,	G. Eugene Bown,.....	Forksville,	1918
Susquehanna,	Dr. E. E. Tower,.....	Hallstead,	1919
Tioga,	C. H. DeWitt,.....	Mansfield,	1917
Union,	J. Newton Glover,....	Vicksburg,	1917
Venango,	Homer C. Crawford, ..	Cooperstown,	1917
Warren,	R. J. Weld,.....	Sugargrove,	1917
Washington,	Jas. M. Paxton,.....	Houston,	1917
Wayne,	W. E. Perham,.....	Varden,	1917
Westmoreland,	W. F. Holtzer,.....	Greensburg,	1919
Wyoming,	G. A. Benson,.....	Tunkhannock,	1919
York,	Geo. F. Barnes,.....	Rossville,	1917

OFFICERS

President

Hon. Martin G. Brumbaugh, Harrisburg.

Vice Presidents

P. S. Fenstermacher, Allentown.
S. S. Blyholder, Kelly Station.
E. A. Studholme, Smethport.

Executive Committee

Matthew Rodgers, Chairman, Mexico.
W. F. Biddle, Everett.
J. Aldus Herr, Lancaster.
B. F. Killam, Paupack.
W. F. Throop, Espyville.
W. Frank Beck, Altoona.
Hon. H. G. McGowan, Geiger's Mills.
C. M. Bower, Blain.
Charles E. Patton, Secretary, Ex-officio, Harrisburg.

Members of Advisory Committee

Joel A. Herr, Chairman, Millhall.
B. F. Killam, Paupack.
E. E. Tower, V. M. D., Hallstead.

Legislative Committee

Hon. H. G. McGowan, Chairman, Geiger's Mills.
C. H. DeWitt, Mansfield.
Hon. Robert W. Lohr, Boswell.
Matthew Rodgers, Mexico.
George G. Hutchison, Warriors Mark.

Committee on Resolutions

J. Newton Glover, Chairman, Vicksburg.
Col. John A. Woodward, Howard.
B. Frank Wambold, Sellersville.
John Shoener, Orwigsburg.
Louis Piolet, Wysox.

Memorial Committee

Joel A. Herr, Chairman,Millhall.
 C. M. Smith,Lewistown.
 Col. John A. Woodward,Howard.

Consulting Specialists

Botanist,Prof. F. D. Kern,State College.
 Pomologist,Chester J. Tyson,Floradale.
 Chemist,Dr. William Frear,State College.
 Vet. Surgeon,Dr. C. J. Marshall,Harrisburg.
 Sanitarian,Dr. S. G. Dixon,Harrisburg.
 Microscopist and Hygienist,Prof. J. W. Kellogg,Harrisburg.
 Entomologist,Prof. H. A. Surface,Harrisburg.
 Ornithologist,Dr. Joseph Kalbfus,Harrisburg.
 Meteorologist,Prof. W. G. Owens,Lewisburg.
 Apiarist,H. C. Klinger,Liverpool.
 Economic Geologist,Prof. Baird Halberstadt,Pottsville.
 Agricultural Geologist,W. H. Stout,Pinegrove.
 Forests and Forestry,Irvin C. Williams,Harrisburg.
 Feeding Stuffs,G. G. Hutchison,Warrior's Mark.
 Soils and Crops,Prof. Franklin Menges,York.

STANDING COMMITTEES

Cereals and Cereal Crops

J. Aldus Herr, Lancaster.

Roads and Road Laws

Col. John A. Woodward, Howard.

Fruit and Fruit Culture

A. I. Weidner, Arendtsville.

Dairy and Dairy Products

R. J. Weld, Sugargrove.

Fertilizers

F. S. Brong, Saylorsburg.

Wool and Textile Fibers

Doris L. Fulkman, New Wilmington.

Livestock

W. O. Black, Mercer.

Poultry

W. Theo. Wittman, Allentown.



**PROCEEDINGS OF THE SPRING MEETING OF THE
PENNSYLVANIA STATE BOARD OF AGRICUL-
TURE, HELD AT HOTEL BERKSHIRE, READING,
PA., MAY 23, 1916.**

May 23, 1916, 9:30 A. M.

Vice President Fenstermacher in the Chair.

The CHAIRMAN: The hour for opening this meeting has arrived and passed, and it is with pleasure that I greet new members and other members of the Board. It is rather a rainy day, but in our section we needed rain pretty badly and we are glad to have it. We have a good representation here; but we are sorry to miss one of the old stand-bys, Joel Herr, and I think that some resolutions passed here and sent to him will please his old heart a whole lot. I hope it will come out during the meeting. The first in order will be the election of an assistant secretary, I understand. That is the Secretary's wish and desire, gentlemen.

It was moved and carried that Dr. Conard serve as assistant secretary.

The CHAIRMAN: Next in order is the roll call of members.

The roll was called by the Assistant Secretary and the following were recorded as being present:

Chas. E. Patton, Secretary of Agriculture; W. Theo. Wittman, Member of State Poultry Society; Mrs. Jean Kane Foulke, appointed by the Governor; and the following members of the County Agricultural Societies: A. I. Weidner, S. S. Blyholder, Walter C. Dunlap, H. G. McGowan, W. Frank Beck, Louis Piollet, B. Frank Wambold, L. J. Bearer, Edward Leinhard, John A. Woodward, M. E. Conard, J. H. Wilson, A. C. Creasy, W. F. Throop, Thos. H. Wittkorn, J. P. Young, Frank Ranck, Peter B. Cowan, Matthew Rodgers, Horace Seamans, Doris L. Fulkman, Edward Shuey, F. S. Fenstermacher, J. E. Hildebrant, B. F. Kahler, E. A. Studholme, W. C. Black, C. M. Smith, F. S. Brong, John H. Schultz, J. Miles Derr, C. S. Messinger, Clark M. Bower, B. F. Killam, John Shoener, Robert W. Lohr, G. Eugene Bown, Dr. E. E. Tower, C. H. DeWitt, J. Newton Glover, Homer C. Crawford, Jas. M. Paxton, W. E. Perham, W. F. Holtzer, and G. F. Barnes.

The CHAIRMAN: Next will be the reading of the minutes.

Acting Secretary Conard read the minutes of the January meeting of the Board.

The CHAIRMAN: Are there any corrections or remarks in reference to the minutes just read?

MR. RODGERS: Mr. Chairman, when we presented that report in regard to the Hon. Thomas J. Edge, we asked permission to rewrite it or present a substitute for it. We have so done, and I hold in my hand the substitute we propose to you for the members to adopt in lieu of the report just read. I will ask the other members of the Memorial Committee, who can see better than I, to read this report and present it to you for adoption in place of the report adopted at the January meeting.

Mr. Blyholder read the substitute resolution.

The **CHAIRMAN:** If the Chair understands correctly, the member from Juniata offers this as a substitute for the resolution now on the minutes?

MR. RODGERS: We had that permission last winter.

It was moved and carried that the substitute resolution be adopted in place of the one adopted at the January meeting.

COL. WOODWARD: I have some doubt as to whether there is any member present of the Board who has known Thomas J. Edge longer than I. I have no intention of undertaking to add anything to the very eloquent eulogy that has been read of him here, but a thought has occurred to me, as I have heard the report, that I want to give voice to, and I think I can best give voice to it by putting it in the form of a resolution. I have not had the opportunity to prepare the resolution specifically and write it out, I must give it as it has presented itself to my mind now, and it is that it would be a fitting memorial, a fitting addition to this ably prepared and feeling memorial for this Board of Agriculture, of which he was the soul and spirit for many a year, to ask, by resolution, the family of Thomas J. Edge to contribute their portrait of him to be hung in the Department of Agriculture, and I make that motion. I move you, sir, that the family of Mr. Edge be requested to furnish a portrait of the late secretary, Thomas J. Edge, to be hung in the Department of Agriculture, and that the Memorial Committee which has prepared this written report, shall be the Committee to carry that resolution into effect.

SECRETARY PATTON: I wish to second the motion that the portrait of Mr. Edge hang in the Department of Agriculture. Those of the other secretaries have been hung there within the last two months and they have become the property of the State.

COL. WOODWARD: I was not aware of that, Mr. Chairman.

The motion was adopted and the Chairman appointed the Committee and requested the members to convene immediately in the gallery and report at the morning session.

MR. KILLAM: We will have to wait for that report unless we pass over and go into Unfinished Business for a few moments. I move that we proceed to No. 6, Unfinished Business, until this Committee makes a report. Here we have appointment of the Committee on

Credentials, reception of credentials of new members and delegates and the report of the Committee on Credentials and next is Unfinished Business. We will get along a little faster if we turn to that a little while. I move that we turn to Section Six, Unfinished Business.

The motion was seconded and adopted.

MR. KILLAM: I want, under that head, to draw attention to the fact of Joel Herr's condition. Joel Herr has got to be aged, he is enfeebled and he is in bad health. I understand he is confined to his room or his bed. I think it would be very fitting that this Committee, which has the authority—I think the Committee would come under that head—to express our feeling of sympathy to Mr. Herr, to give him a little expression in writing from this State Board of Agriculture. I make a motion that if this Memorial Committee hasn't the authority, a committee be appointed to draw up resolutions of sympathy and appreciation of his service with us in times past and our regret that he is not here with us. This Memorial Committee would hardly be the one to do it, would they? I move then, that a committee be appointed.

The **CHAIRMAN:** To draw up resolutions of sympathy, I understand?

MR. KILLAM: Yes, sir.

The **CHAIRMAN:** How many members?

MR. KILLAM: I would suggest three. I don't want to be honored myself—Col. Woodward—three would be a committee.

Motion was seconded and adopted and the Chairman appointed Mr. Killam, Col. Woodward and Mr. Rodgers as a committee.

The **CHAIRMAN:** Is there any other Unfinished Business, gentlemen? If not, we will turn back to New Business. Is there any New Business? Is there anything for the Good of the Order? (Laughter). If there is no business, remarks by some one will be in order.

Member: I would like to ask a question; probably some member of the Board can answer it at this time. Why is it that tent caterpillars are so unusually numerous this year?

The **CHAIRMAN:** Prof. Menges will probably be able to answer that, he is an entomologist. I saw him in the audience.

PROF. MENGES: What is the question? I wasn't paying attention.

The **CHAIRMAN:** The question is, Why are tent caterpillars so numerous this year?

PROF. MENGES: They are not any more numerous with us than they usually are, and I find there are a lot of fellows who are permitting wild cherry trees to grow along their fences, and the caterpillar likes the wild cherries and wants them, practically, more than any

other tree. If you'd keep wild cherries down and keep your fence rows clean, you wouldn't be troubled with the tent caterpillar. I think that is the cure, and evidently the enemy of the tent caterpillar is not very active; just why I don't know. Last summer, the latter part of the summer was very wet and evidently the enemy of the tent caterpillar could not destroy the eggs, could not destroy the tent caterpillar as it usually does. That may be another reason the tent caterpillar is so plentiful. I don't know whether that is an answer to your question, or not. It just occurred to me on the spur of the moment.

MR. PERHAM: If we do not have the wild cherry, won't they go into our fruit trees more?

PROF. MENGES: But you will have them on both, if you raise them on the wild cherry, then you will get them on your fruit trees also: They prefer the wild cherry, you know that. In some sections of the State, they are wonderfully plentiful.

A Member: If you don't have the wild cherry, you do away with the tent caterpillar, is that right?

PROF. MENGES: No, I do not say that, but if you have the wild cherry, you are giving him a very desirable place to live. I cannot see why the farmer should have fence corners. I think we have come to a time when we want to do away with the fences.

A Member: Well, that is my opinion and I am trying to get them off of my farm, but I am not succeeding very well because I have neighbors who want to pasture and, therefore, they want fences. There are no tent caterpillars where there are no wild cherries.

MR. KILLAM: I expected Prof. Menges to recommend a caterpillar day, some day in the year when they destroy the tent caterpillar; the numerous bird societies, for the preservation of bird life, may be an incentive to the farmer to let the tent caterpillars grow on the wild cherry, not destroy them.

PROF. MENGES: I would recommend a caterpillar day, we need it badly. The birds do not eat the tent caterpillar, the only things that attack them are certain kinds of spiders and we have waited until our own trees were infested. If every one who saw a tent caterpillar nest would go and destroy it and not wait until he himself was hurt by it, we would have less of them. They live more happily on the wild cherry, which we do not need; it is not a fruit-bearing tree and very few birds eat wild cherries. If we would destroy those and not wait until our own trees are infested, but do it *pro bono publico*, because we ought to do it, they would soon disappear. You cannot depend on the birds, because the birds do not eat them.

MR. RODGERS: I had some trouble with the tent caterpillars but I went after them and destroyed all the cocoons of eggs I could find. I would get on a horse and ride around every tree, and after the trees got large, and before the trees got large, I would walk

through the orchard. People used to say, "Look at that fool, what are you doing?" "Killing caterpillars." "The idea of killing caterpillars in the winter." I destroyed all the cocoons and consequently was not troubled by caterpillars like my neighbors. When I found one that I had missed, I'd go around on my horse and take my hand—(laughter). It was a dirty job, but I had plenty of soap and water afterwards and I got away with the tent caterpillar.

MRS. FOULKE: In connection with those tent caterpillars, I would like to say that they do most of the damage at night. In the daytime they go back into their nests, so if you want to destroy them, the time to do it is daytime, don't wait until evening, because then the young caterpillars are eating. A great many people go into their orchards with a torch and try to burn them, but you injure your trees seriously when you do that. You ought to cut off the stick or branch and put it on the ground and then do it. I think it is better in the winter than not at all, but this season is the season to do it, or a few weeks ago before the young caterpillars got out.

MR. WEIDNER: In Adams county we use the lime-sulphur spray and we very seldom see a tent caterpillar. We find some of them on the wild cherry, but the lime-sulphur spray will destroy the eggs.

A Member: Mr. President, I cannot agree with that. I have sprayed with lime-sulphur as carefully as anybody for six or seven years, and I have had as many tent caterpillars afterwards as before.

A Member: Do you use arsenate of lead in your spray?

A Member: Yes sir.

A Member: In our section we keep them back by using arsenate of lead in the spray.

MR. DEWITT: I noticed in coming through Tioga county that the tent caterpillars have started in a regular camping army. There seems to be none of you able to give any recipe for getting rid of them. We ought to be able to get rid of them some way. I think, as Brother Schultz says, what do we need with unnecessary fences and hedges to grow up this worthless cherry tree? In my place, we took particular pains to cut down all those breeding nests, and I think myself it had a tendency to do away in that particular place with the tent caterpillar. In coming across the different counties that I came across to get here, I couldn't help but notice the farms and the condition of the fences and the condition of the brush and briars that grow up in them. I cannot understand, gentlemen, why it is that a farmer would allow a thing that would make his farm look so disgusting to men who like to see a decent farm. Why they should allow such a thing to prevail, when a little work would rid a man's farm of those nuisances I am unable to tell. I cannot understand why the farmers of the State would allow so much valuable land to go to waste. Many farms that you pass you see they are plowing up so that there will be a rod or two rods of just a dense

mass of elders and brush and briars and those cherry trees in a row right through the farm in and around those fences. I think that some of our farm advisers and some of our lecturers ought to give our farmers when they come to visit their farmers institutes, a thorough house cleaning on that subject. It is a most deplorable condition, and a most disgusting thing to the average farmer who likes to see things in a respectable shape.

MR. PIOLLET: I agree with the brother to a certain extent. I would say that the farmers of Pennsylvania, while they would like to have their fence corners cleaned out, their buildings painted and everything of that sort, they haven't got the money to do it, they haven't got the labor to do it. There are certain things about the farm that require to be done and it takes all the help they have about them and their own labor to prepare the ground for the crops and grow them, and it is very seldom that they have time to clean up these fence corners.

MR. DERR: I cannot agree with you in that. I farm and teach school too, but we take time to tear out our old fences and clean the fence rows out to the roadside. We have a few caterpillars in the orchard but we get them early in the season. We have some excuse so far as labor is concerned, but I find help and by working 16 hours a day during the busy season, we get this work done.

MR. HERR: While we have diverged somewhat from the tent caterpillar—in reference to keeping your farm in order, it is a general custom with our people in Lancaster county to clean their fence rows twice a year, both before and after harvest, and that has been the custom ever since I can recollect on our farms, which is more than two or three years, and in our neighborhood the weeds are continually mowed every year, mostly twice a year, and we would no more think of not doing it than of abandoning any part of our system of farming, and there isn't any excuse for a man having ten feet for a fence: that is up to the man. We think we do some work in Lancaster county occasionally and get pretty busy, but it is the busy man that gets it done, there isn't any doubt about that. There was a gentleman from Louisville, Kentucky, here sometime ago and he said, "I am astounded that you farm up to the fence." I said "Certainly, why not? What is the use of paying rent for ten feet of space and not farming it?" In our county, where we grow tobacco and truck quite a good deal, this spring our plants—tobacco plants or tobacco beds, and our asparagus beds have been literally infested with snails. Never in my life have I seen anything like it. Yesterday morning in cutting some asparagus, I presume eight stalks out of ten that were cut had snails on them, and quite a good many of the tobacco plant beds in the county have been ruined by snails before we knew much about it. Not in thirty years have I had one bed of plants destroyed by snails. I used a solution of arsenate of lead, but it was too late, but I have never seen them attack asparagus. How are you going to defend yourself in an asparagus bed? Because, in 24 hours, a shoot grows up and you cut it off. I would like to have some information how to get after them, it is a pretty serious matter.

MR. BLYHOLDER: I would like to ask Mr. Herr if it would not be a blessing to mankind if you let the snails have all the tobacco?

MR. HERR: That depends on how you look at it, very much, I presume. When our Board was in our county a few years ago, if it hadn't been for the income from the tobacco, you gentlemen would have fallen short in some of your meals.

A Member: That is where he gets the money to clean out the fence corners. On our river flats in Bradford county we don't have any fences, and where we do have them, they are cleaned out. But you go back on the hill farms, where they do pasture mostly, and I would like to have you point out to me how many farmers keep their fence rows cleaned out; it is impossible to do it, they haven't time, haven't got help enough to do it, you can't get labor enough to do it, on the farm. This may be a little off the question of the tent caterpillar, but the gentleman spoke about the hedge-rows, etc. and I couldn't help thinking there was some little thing wrong there.

MR. PERHAM: I make this suggestion, that our Secretary of Agriculture appoint a caterpillar day and see if we cannot get our school children and the boy scouts to spend one day getting after the tent caterpillar; I think they will do more to exterminate them than all the rest of us.

DR. TOWER: I use the Bordeaux mixture. I spray the trees before the leaves are fairly started, and then again just as the blossoms are coming out and then again just after the apples have set, and at that time the caterpillars were very plentiful all over the neighborhood, but in my orchard of about 150 trees, there was one tree clear in the furthest corner, that had three little nests. Aside from that there wasn't a tent caterpillar nest in that orchard, while the neighbors didn't do any spraying and had any amount of them. I believe that this spraying, if it is done as it ought to be, will kill the tent caterpillar.

MR. KILLAM: If you want to get up a great big discussion, just let four or five get together and some one say something about good roads, and if you want to continue further, talk about how they shall be built and you will be way along into the night discussing it. I think it is up to the Secretary to recommend the most feasible way to get rid of the tent caterpillar. There is no better way in the world I think than to set the boy scouts after them; they will look for them and destroy them and wish they were more plentiful, so they could destroy more.

The CHAIRMAN: We will be glad to hear from the Secretary on this caterpillar question.

SECRETARY PATTON: The Secretary is very willing to look up a remedy for the caterpillar; we will take that up with our experts and see what we can do. I think, though, gentlemen, that to get the boy scouts interested is a very good idea. There are lots of communities, however, where you wouldn't find any boy scouts, and to get

the school children interested is a good idea. As far as the boy scout proposition is concerned, I think there are communities where they wouldn't help at all, but the school children will. However, I will be very glad to take the matter up. I don't think we ought to have any more "days;" we have got a "Rooster Day," a "Good Roads Day" and we have about three weeks for seeing the farms of the State. If we have many more days, the farmers won't have any time to do their work. I will take up the matter of finding a remedy for the tent caterpillar and I think we can find some.

MR. BLYHOLDER: This question has drifted towards the fence question. I have thought for a number of years that our laws compel us to build too many fences, and it is my observation in the last few years, I have noticed in a number of instances this, that where a progressive farmer is using progressive methods and intensive farming, here is a neighbor alongside of him following the old routine, and he compels him to build perhaps several hundred rods of fence, because he is careless and must make his cattle eat when they ought to be in the barn and housed. So it seems to me that this Board ought to express itself, that the time for fences is past, and the man who must have fences, let him build them and not compel his progressive neighbor to build them for him.

The CHAIRMAN: It just struck the Chair, listening to the discussion on the caterpillar and fence question—just across in Lehigh county there are very few progressive farmers who would think of fencing in arable land; the only fences we have are pasture tracts. There is no necessity for having fences around arable land, it is just a waste of time and makes a nest for weeds and pests like the caterpillar. I think some resolution covering what Mr. Blyholder said in regard to this fence question should be adopted; it is a question of prevention of the caterpillar more than a question of cure. We don't need any fences on arable land; we get along fine without them. Not one-tenth of your land in Lancaster county, Brother Herr, needs fencing.

MR. HERR: Must you not make your line fence between you and your neighbor?

The CHAIRMAN: If your neighbor demands it, yes, but not along the highways.

MR. KILLAM: I don't think this question could be any better settled if a committee worked at it for a long time. We don't have to build any fence at all along the highways, only a line fence between our neighbor's land and ours and fence our own cattle so that they won't get out to injure our neighbors. I don't think it could be settled any better than it is.

MR. STUDHOLME: I make a motion that this Board go on record as favoring the repeal of all the old fence laws.

MR. PIOLLET: I second the motion.

A Member: When you repeal the fence laws, you put yourself in a position that if you have a neighbor who is not inclined to build any line fences, what are you going to do with your pasture land? I have about 80 acres that I pasture. If I have to go to the expense of putting a fence entirely around that 80 acres in order to have the benefit of my land for pasture, it does seem to me that the other fellow should do his part. Some of his cultivated land may run up to that pasture plot of mine; it puts us in such a position that we will no doubt get our feet tangled up so that we won't know how to get out. I think, as Mr. Killam says, that our fence laws are just about right. I have some brush growing along my fences that it is pretty hard to keep clean, but I cut my brush every year; on the cultivated land I have wire fences along the roadway and have them high enough from the ground so we can mow the weeds out and don't have any trouble in that direction. I feel as though we might get something a whole lot worse than we have now if we change the fence law. The fence law now I think is very satisfactory if each and every one of the citizens of Pennsylvania does his part. I do not believe we are ready to make any change in that direction.

COL. WOODWARD: I feel that I must go on record as voting against this resolution for the following reason: It seems to me that nothing could be more just and right and honest than that the line fence between two men, where it is desirable to be marked by a fence so that the man on either side may use his own property as he wishes, is just and right and I am very much afraid that the sense of justice in all of the people, all of the farmers of the State, would feel itself outraged if such an act were passed, if the repeal of that act, which is practically the only fence law we have in Pennsylvania, should be enacted. It is a thing we should carefully consider before we put ourselves on record. If there is anything in God's world that will raise — well, I won't say it, I'm a Presbyterian (laughter) trouble between neighbors, it is to abolish that law for the line fence. It is there and there to stay, and will have to be there to stay if we don't want to increase the number of courts in Pennsylvania to get the quarrels between farmers on line fences adjusted.

MR. SCHULTZ: I am sorry that I have to differ with Mr. Woodward. I believe in justice and I do not think it is right, if I don't want to keep any cattle on my place or if I want to keep them in my stable, don't want to pasture anything, I am obliged to make fences for the accommodation of my neighbor, I don't think that is justice. I think that if my neighbor wants to keep stock roaming over his farm, it is his duty to keep them within the bounds of that farm and not mine, and I believe the time is coming, if that line fence law is done away with and each man has to look out for his own stock, it will make that careless farmer possibly open his eyes and keep his cattle where they belong, in the stable, and feed them there; if he hasn't got permanent pasture and it don't pay him to run a fence clean around that pasture, it is not very profitable.

MR. PIOLLET: I came from Allentown direct today, and if you didn't see any more cattle than I saw turned out on that ride, it wouldn't make any difference whether you had fences or not, but in the dairy section of the State everybody has cattle and all the farmers use their pasture land as much as the land not fit for anything but pasture, and without that use we couldn't keep our cattle and the State of Pennsylvania would not produce as many pounds of butter as it does today. Now I do not believe that you could get any class of men in the Pennsylvania Legislature to repeal the law to have line fences, and I, for one, am against the resolution.

MR. BLYHOLDER: The reason cited by the brother to the left here is the very reason why the fence laws should be repealed. Suppose I have a pasture lot and want to use a pasture lot of 50 acres, and it joins along the farm of that brother; he doesn't want to pasture or fence his land but he is engaged in intensive farming. Now, is it right that I should compel him to spend his hard-earned money to build fences for me? It is an injustice today and I know in my own neighborhood a farm that it takes perhaps 500 rods to go around it and that man don't want to do any pasturing at all, but he is compelled to build half of that fence at a very great expense to accommodate his neighbors. If it is not worth while, sir, to fence a piece of ground, you'd better sell it or abolish your pasturing and your cattle; if it does not pay you to fence it, it is not paying you very much money.

A Member: You can't always sell it.

MR. BLYHOLDER: Then fence it, if it is worth anything to you; if it is not worth fencing, it is mighty poor land.

MR. KILLAM: My reason for seconding that motion was to get it before the house, and it seems to me that it has been thoroughly discussed. I should hate to vote for that resolution; I merely seconded it to get it before the house.

The CHAIRMAN: Are you afraid of your constituents? (Laughter).

MR. KILLAM: No, not a bit, the law suits me exactly. I am glad that the law compels the fellow whose land adjoins me to build half of the fence.

PROF. MENGES: I am not a member of this Board, but, my friends, the State of Pennsylvania is pretty large and there are places in the State where it is well-nigh impossible not to have these line fences because the land is virtually all pasture land and it is only valuable for that purpose. Now, then, if we do away with the fence law over the State of Pennsylvania, we do away with the fence for that man, the man who needs it. Go over into Washington county, into Greene county, into parts of Fayette county, into other mining counties, and you will find that the people, the larger part of their cattle are kept upon pasture, and as my friend here from Bradford county says, we will have to do away with our pasture land or fence

it ourselves, when the neighbor needs the fence just as much as we do. Now, shall we burden these men who have this pasture land in this way? It is the Kentucky Blue Grass pasture, there is nothing like it anywhere in the world that I know of, I say, shall we take away from these people their rights by a resolution of this sort? Will the State Board of Agriculture of Pennsylvania go on record as favoring such a proposition?

PROF. KERN: Take 99 farmers out of 100 and they pasture their stock more or less; would it be wise for us to pass a law to help the one farmer to the disadvantage of the other 99? Which do you want to look at, the 99 or the one?

MR. DEWITT: Since Brother Menges has spoken, I have hardly a word to say. This thing I wish to be said, that when this law was passed doing away with road fences, I do not believe there was a man in Tioga county who spent more time than I did to get that law passed; for God's sake, let us not do away with a good thing.

DR. TOWER: That might do in some places, but you take it as Mr. Perham has just said. suppose you want to keep a lot of young cattle, are going to keep them in the barn all their life when the pasture is the most natural thing in the world for cattle? A little while ago I was called to see some cattle that were thin and run down and very much covered with lice. On inquiring into the causes that brought on this condition, I was informed that those cattle had not been out of the barn since last fall; that is just the condition you will find in nine out of ten cases where cattle are kept in the barn. You will say you don't need to do that, but do you do it? You will find that where cattle are kept in the barn, they will breed disease, it is not the natural place for them, a cow wants to be out in the pasture, that is the most natural place for them to live. Do away with the fence and keep the cattle in the barn and see what you will get.

The CHAIRMAN: At the last session of the Legislature there was a bill presented by the Senator from Lehigh, defining what a line fence should be. We have no act defining what a fence of that kind should be. The township auditors are also fence viewers; they decide what a line fence is or should be, and there is no appeal from their judgment. This bill went into the question very thoroughly; it was endorsed by the Department of Agriculture and passed first reading in the Senate, but then it stirred up a hornet's nest. To the utter amazement of the Senator who thought he was doing something that would be a great help to the farmers of the State, he found that even some of the farmers were opposed to this bill and the railroads were all opposed to it, and do you know why? To his utter astonishment, the act of 1905, signed by Samuel W. Pennypacker, a farmer, exempts railroads from building line fences. If a railroad is exempt from building a line fence, why must a poor farmer build a line fence to accommodate his neighbor? Is that justice? These are facts. I am not afraid to go home and face this thing.

A Member: They repealed that Act of Pennypacker's.

MR. PIOLLET: The State Board of Agriculture and the Department of Agriculture and our Governor at the present time are recommending that we grow sheep in Pennsylvania; if you do away with your fences, how are you going to keep the sheep in?

The **CHAIRMAN:** Build your own fence.

MR. PIOLLET: Let the other man alongside of you build half of it.

The **CHAIRMAN:** Not if he doesn't want to keep sheep.

A Member: If there is only one member here who votes for that resolution, I want to be put on record as voting for it. I think it is a curse to the farmers of this country to keep a lot of old brush fences that are always a source of contention and fighting, and that law ought to be wiped off our books.

MR. BARNES: I want to go on record as being opposed to the resolution. I would be ashamed to go home and tell the farmers in my neighborhood that I was in favor of it.

MR. DERR: I want to go on record as being against this resolution. This is a day when local option is abroad and I would suggest that we have a local option clause and those that want the line fences, let them have them.

The **CHAIRMAN:** Mr. Secretary, can you give us the resolution?

ACTING SECRETARY CONARD: It was not presented in writing.

MR. PIOLLET: The resolution was to repeal all fence laws in Pennsylvania.

SECRETARY PATTON: I would request that the mover of the resolution hand it in in writing.

MR. KILLAM: It was a mere motion put before the house that all fence laws be repealed.

The **CHAIRMAN:** Read the resolution.

ACTING SECRETARY CONARD: "That the State Board of Agriculture go on record in favor of the repealing of all State laws." (Laughter).

MR. PIOLLET: All State fence laws.

The resolution was then put to vote and was lost.

MR. PIOLLET: Now, Mr. Chairman, I want to say a word on the caterpillar question. You may have taken it from what I said that I do not know anything about it, but if you will get a pole and put a rag on it wet with kerosene oil and swab out the nest as soon as the caterpillar appears, you can destroy them and won't have any in the orchard.

A Member: That is the best practice in the world and is an effective one to my certain knowledge; it is dead easy.

MR. RODGERS: You keep plenty of sheep in with your cattle and they will keep the briars and brush and everything down; that is just what we need in the State, more sheep. (Cries of kill the dogs).

MR. PIOLLET: If we get a law passed in our Legislature to get rid of all the dogs in the State of Pennsylvania, we can raise sheep. (Laughter).

The CHAIRMAN: Will the Committee on Credentials hand in their report now, if they are ready?

MR. BRONG: We have a single credential handed in and it is written on the back of the sheet.

The CHAIRMAN: The recommendation of the Committee is that we admit R. P. Heilman, from Cameron county. A motion to that effect will be in order.

MR. BRONG: Mr. Chairman: The Committee finds that the certificate is without a seal; also that the affidavit of the expiration of the commission is not filled in. Your Committee recommends that those be secured, through the Secretary, and on the condition of those being secured, that he be admitted to membership.

MR. RODGERS: I move that the member be admitted on this condition.

The motion was seconded and adopted.

The CHAIRMAN: Miscellaneous Business is next. If there is no business, the Chair will take the liberty of calling on some to make some remarks; we will have plenty of time.

MR. MCGOWAN: Before the speech-making commences, I want to call attention to the fact that the Chamber of Commerce of Reading has kindly prepared a number of souvenir badges and programs here. We want every member of the Board to have one of the badges and programs. We appreciate this meeting very much and are glad that the Chamber of Commerce saw fit and appreciated this Convention sufficiently to do this work. The Committee of Arrangements have arranged at the close of the afternoon session at 4 o'clock to give all the members and delegates a little excursion over some of the principal farms here to Wernersville and the mountain homes there—the sanatoriums. There will be cars in front of the hotel at 4 o'clock and they will deliver you back here by 6 o'clock, and we have a number of other little features that we want to add for the pleasure of the Board which we will announce later. I will not speak of them now because you might get them all mixed up and forget the good things in store for you. This afternoon at 4 o'clock there will be automobiles here, and I would suggest that we convene as promptly as possible this afternoon so we may get through our work and take advantage of this excursion which has been arranged for at 4 o'clock.

MR. KILLAM: I wish to draw attention to a certain matter. **Mr. Henry Flummery**, of Plymouth, Wisconsin, President of the Sheboygan County Cheese Producers' Association, was here at the hotel and I told him to get in touch with the Secretary of Agriculture. He did not find him and he handed me his card. He wanted permission to come before this meeting and talk to them a few minutes in relation to the production of cheese and the amount produced and how they produced it and how they drove the Cheese Trust out of the State of Wisconsin. I thought it might be interesting and their prices are better and they are making money in their cheese production. He was a farmer brought up on a farm and lived on a farm all his life until within the last year, and he is now selling cheese and has this matter in charge, and he wanted to come before this meeting at some time. He was here in the city and he wanted to talk to them a little about it, bring this matter to your attention for what it is worth.

MR. FIRST: Is he going to be here for several days?

MR. KILLAM: I don't know. I understand that he will call on me this afternoon and I will refer him to you.

(The Chairman then called attention to the program for the afternoon.)

MR. KILLAM: I see here addresses of welcome by **Hon. Harry D. Schaeffer**, Judge of the Orphans Court, and **James P. Hennessy**, President of the Berks County Agricultural and Horticultural Association; is that correct?

MR. MCGOWAN: That has been changed; **Mr. Schaeffer** was suddenly called to Scranton and we have arranged for the Mayor of the city to take **Mr. Schaeffer's** place; that part of it has been changed, the Mayor has kindly consented to be with us.

The **CHAIRMAN:** Before the Board adjourns, at all our meetings there was always one voice present who had something for the benefit of agriculture. The gentleman I refer to has given the best part of his life, you might say, in behalf of the agriculture of Pennsylvania, always foremost, always defending, always endeavoring to uplift it; for many years Deputy Secretary of Agriculture and Director of Farmers' Institutes, and I am delighted to have him present at this meeting, and before we adjourn I think we ought to have a few words from **Mr. Martin**. (Applause.)

MR. MARTIN: **Mr. President**, Friends and time honored members of the State Board of Agriculture: It does my heart good to occupy a seat in your assembly. It recalls many pleasant hours and years in which we have engaged in this great work. You have been discussing some of the questions that are of vital importance to agriculture promiscuously, we may say, discussing them, for I believe there are but few ways in which we may arrive at a just and proper conclusion upon questions other than that or promiscuous discussion in which the sentiment, the will, the voice of the farmers of the State may

be best and properly arrived at; and now my friends, you are not only time honored, but you represent the one great organization that has accomplished more for the development of agriculture, I feel safe in saying, than of any or all others in Pennsylvania, (applause) because you organized and laid the foundation well for farm development and good home life, and you stand as the living representatives of a higher and better agriculture, and my advice to you is, if it is worth anything, stand for the great interests of agriculture at all hazards; it is safe in your hands. (Applause.)

The CHAIRMAN: As an insignificant booster of agriculture in the rear of the house, the Chair will be glad to hear from Mr. Dorsett; the Chair knows he can make himself heard.

MR. DORSETT: Mr. Chairman, I have been trying to hide back here until they got the caterpillars all killed. I believe that you are to hear from me this afternoon and again tomorrow. I don't know that I ought to take any time now. I am very glad to be with you at this, your first session, and I was interested in the manner in which you went after the caterpillar and the fence. If you take up the other problems with the same zeal, the same vim and energy, I think you will at least accomplish something along that line. I was also glad to hear our old friend and co-worker, Brother Martin. It would seem to us who have been in this work for some time as though something were missed if he were not here. I am glad too that so many of you are here at this, the first session, and I hope that the members of the State Board of Agriculture will remain for the sessions which are to follow and that you will enter into the discussion relative to the institute work and others phases of the work just as heartily as you have done this morning.

The CHAIRMAN: I think at this time that a few words from Mr. Campbell, of Crawford county, would be appropriate.

MR. CAMPBELL: Mr. Chairman: I don't know that I have anything at all to offer. I am not a member of the Board, though I am always interested and glad to be in the meetings. I have attended a good many of them; when I can, I always make it a point to do so, but during the past few weeks, particularly, I have been extremely busy with the work that seems to have fallen to my hands, and while the work is somewhat new to me, at least I feel it, yet I don't know whether I am rendering the service to the State of Pennsylvania that I ought or not, but I am making an effort in that direction, at least. There is one thing I do realize, that is growing out of the work of the advisory work. Perhaps the men that had that work in mind when they prepared the measure making possible this work, did not foresee all the good things that were going to come from it, and I see somethings growing out of it already that it seems to me are going to be worth while. It affords a man engaged in it a wonderful opportunity to know at first hand the real, actual agricultural conditions of the great Commonwealth as no other man can get at them or know them, it seems to me, and if it did not accomplish anything more, it seems to me that it is worth while that we have in the State

of Pennsylvania a few men who have had an opportunity to become thoroughly familiar with agricultural conditions as you find them on the farms and among the working farmers of the State; and that opportunity they could get, as I see it, in no other way, and it seems to me that the opportunity afforded along this line is and should be of increasing value to the farmers of the State. That is the way it looks to me. It seems to me to be really worth while, that feature; it grows as I go ahead in the work, and I feel that I bespeak the experience of the others in the work when I say that this has afforded those engaged in it a wonderful opportunity to know at first hand the real, actual agricultural conditions that prevail among the working farmers of the State of Pennsylvania on the land as they cannot get it in any other way.

The CHAIRMAN: Before adjourning I think we should hear from the Secretary, Mr. Patton.

SECRETARY PATTON: Mr. President, and Members of the Board: I am very glad of this opportunity to be with you again and I want you to remember that you have only one person to remember while I have about sixty or seventy of them. I know that some of you thought I looked you in the face this morning and didn't know you. I did not, and it is not to be wondered at, because most of you I have only met once or twice in the six or seven months I have been connected with the work. Don't feel that I am trying to slight you or that I don't want to know you; I do want to get well acquainted with every member of this Board, for I think you are the greatest organization we have in the Department. (Applause.)

I want to thank you for the work that has been done during the last winter in our Institute work. As we, for a while, did not have any Deputy Secretary, I became very much interested in the work and Mr. First took up a great many questions with me and I know something of the good work that has been done throughout the State by the Chairmen in the different counties, and I want to impress upon your minds that the success or the failure of that work depends on you. You cannot expect good meetings except by putting up a few notices of those meetings. You ought to get out and get a little enthusiasm stirred up, make an effort, it don't take much sometimes but it brings great results. Some of our meetings are well attended, the majority of them. I think that the number that attended the meetings was nearly equal to what it was the year before, and you know that last winter was a very bad winter for meetings, but in some places they were a complete failure. I don't know what the conditions were; it may have been due to the weather, it may have been the fault of the Chairman—I wouldn't say, but remember that a great deal depends on you. If anything should happen to the Board of Agriculture I don't know what would become of the Department of Agriculture. You are the friends who stand between the Department and the farmers of the State; you are the ones that make sentiment either for or against the Department. If we were to lose you, we would lose the best friends that the Department have, and I, for one, would be sorry to see anything done that would interfere with you.

As far as advisory work is concerned, we have more of that work than we have men to do it. The inquiries that come in for men is far beyond anything we can take care of at the present time. We are doing the best we can, appropriations are entirely too small to cover the work. We ought to have twenty farm advisers, where we have ten; we ought to have ten thousand dollars more for institute work, at least, than we have at the present time, and I believe that Mr. Martin will bear me out in that. We are hampered in all the work of the Department at the present time. We are trying to get through without a deficit and we are not going to be able to do it. Of course in the Livestock Sanitary Board the indemnities that have to be paid are eating up that fund. Outside of that we can get through fairly well. I think these are facts that the Board should know because you are the friends of the Department and should know what it is doing. I will be glad at any time to have any of you come to me with questions and I will try to answer them if I can, in regard to the work, because I think that you ought to be all acquainted with what is going on in the Department. (Applause.)

MR. KILLAM: Before we adjourn, I want to say a word as to the advisory work as far as I know about it in our section of the country. The Secretary of Agriculture arranged for farm advisory work in Leland township and Egypt Mills, and I have been in direct communication with those people since that, and they write me, I have their letters, that they received greater benefit from the Farm Advisers who visited them than they had from the Farmers' Institutes. Those people who write me had their farms visited, and I believe that the farm advisory work is doing lots of good, and in our own section of the county we have had two, and it is surprising what an uplift it is for the farmer. We have had Mr. Campbell and Mr. Van Noy there with us, and Mr. Campbell was at Greentown and I have had very good reports from there in relation to his work.

MR. SCHULTZ: I think we ought to hear from our Deputy Secretary, too.

The **CHAIRMAN:** If the Deputy Secretary is present, we would certainly be glad to hear from him. While Mr. Carothers is being brought in the room, I don't know why it was, but I know that we have one member of our Board who perhaps represents as much as all the rest of us together, and I therefore take the privilege of calling on that member, and that is Mrs. Jean Kane Foulke; she represents one side of the house while we represent the other.

MRS. FOULKE: I feel very much embarrassed to be asked to represent one side of the house all by myself. I find that there is a demand not only for my personal work but for work in more territory than I can cover. I am getting so many requests for my personal services all over the State that it makes me realize, whether I am doing the work well or not, that there is a great need for it. I don't think even the men realize what it does mean and will mean to have some one going through the country and into their homes. It has been a new thing and I found that it had to be developed by going more to meetings than the men have found by going actually to farms; I mean we have had little social gatherings where a handful of women

will gather together. At all these meetings the matters taken up have been things that related to the home and school, to the betterment of general home conditions, to things that lead to a happy as well as a useful life. If I were like those tent caterpillars and could get out over the trees and the ground as they do, I could fill my time fuller than it is. Just the other day I was down in Wayne county for two days and I intended to visit ten homes. Any of you men who visit ten homes and talk to the people there about building up their herds and farms, you will notice how much you can cover, and it is just as difficult to cover the home end of it. I simply went in there and met those people and made friends with them; they were sorry when I came away and I was sorry I had to come, because I had another place where I had to go; each day I find the same thing; if I were eight or ten, I think I could be busy, in fact I am so busy that I even work at night and travel on Sunday, which I shouldn't have to do. I cannot even read up and rest up; I am getting to be an old woman and I don't want to do that.

(Mr. Blyholder takes the Chair.)

The CHAIRMAN: I am informed that the Deputy Secretary is not able to come in just at this time; he will be with us this afternoon. I don't know why the First Vice President left the Chair unless he was getting hungry and left me to preside.

SECRETARY PATTON: I intended to say something about our trip this fall. We planned to take in every county-seat in the State, but we found that would make the trip about seven hundred miles and would require us to make about 175 miles a day and that would make it a little bit hard; but we are going over it now with the Highway Department and trying to get it rearranged and we expect to have it done in a very few days, when I will have maps made of it and sent to each one of you so that you can take it up. We are going to have our meetings in the daytime; meet somewhere about noon. We are going to hold our meetings with the farmers out on the farms or in the groves and spend about an hour and a half or two hours at noon in place of taking it up at night. That will give the farmers and their wives and children a chance to get acquainted, I believe it would be better than to have those meetings in the towns so that the farmers won't have to go in at night and take their families. We will have to take at least three weeks. We expect to take the first trip leaving Harrisburg and going through the northeast and taking in the counties in that section of the State. The second leaves Harrisburg and goes through the northwest, and the third leaves Harrisburg and goes through the counties in the southwest, and another week we will take the southeastern part of the State, which is a very short run. I took it up with the Governor yesterday afternoon and we had our maps and he said he thought it would be too long, so the Governor and the Highway Commissioner are going over it and I will have the route ready in a very short time and send each one of you a map and I would like to have suggestions as to about where we will meet each day about noon, so that we can make our arrangements far enough ahead.*

*Note.—Rearranged plans embrace but three trips; the third one including the southeastern section, going as far west as Somerset, returning via. Huntington.

MR. MARTIN: I suggest that when you come to the western part of the State you will be given a hearty welcome at my humble farmhouse in Lawrence county.

SECRETARY PATTON: We will more than likely go through your place, Mr. Martin, and I believe we will have a hearty welcome.

MR. PIOLLET: Do you expect to visit the county seats of each county?

SECRETARY PATTON: No, but we expect to go as near them as possible; you get the best roads usually through the county seats.

MR. PIOLLET: We have three quite important villages in our county, but if you come to the county seat, I think that all the people from those villages will go there. My farm is within three miles of the county seat; you can come there if you will.

SECRETARY PATTON: If you make arrangements, we will be there for dinner. (Laughter.)

MR. CONARD: I move that we now adjourn with the understanding that if necessary at any time the Chairman has the privilege of calling an extra session, a special session, as it were.

(The motion was seconded and adopted.)

COMMISSION OF AGRICULTURE

H. V. White, Bloomsburg, Pa.
George M. Patterson, Williamsburg, Pa.
Morris T. Phillips, Pomeroy, Pa.,
M. E. Bushong, Quarryville, Pa.
Alba J. Gilfillan, Smethport, Pa.
L. B. Sexton, Rome, Pa.
Henry T. Moon, Morrisville, Pa.

LIST OF COUNTY INSTITUTE MANAGERS FOR THE SEASON OF 1916-17

County.	Name and Address of Chairmen.
Adams,	A. I. Weidner, Arendtsville.
Allegheny,	C. L. Hood, Coraopolis, R. D. No. 3.
Armstrong,	S. S. Blyholder, Kelly Station.
Beaver,	Walter C. Dunlap, West Bridgewater.
Bedford,	W. F. Biddle, Everett, R. D. No. 2.
Berks,	H. G. McGowan, Geigers Mills.
Blair,	W. Frank Beck, Altoona.
Bucks,	B. F. Wambold, Sellersville.
Bradford,	Louis Piollet, Wysox.
Butler,	W. H. Milliron, Marwood.
Cambria,	L. J. Bearer, Hastings.
Cameron,	R. P. Heilman, Emporium.
Carbon,	Edw. W. Leinhard, Lehighton, R. D. No. 2
Centre,	John A. Woodward, Howard.
Chester,	M. E. Conard, Westgrove.
Clarion,	J. H. Wilson, Clarion.
Clearfield,	T. L. Way, Clearfield.
Clinton,	Joel A. Herr, Millhall.
Columbia,	A. C. Creasy, Bloomsburg.
Crawford,	W. F. Throop, Espyville.
Cumberland,	T. J. Ferguson, Mechanicsburg.
Dauphin,	E. S. Keiper, Middletown.

List of County Institute Managers for the Season of 1916-17—Continued

County.	Name and Address of Chairmen.
Delaware,	Thos. H. Wittkorn, Media.
Elk,	John G. Schmidt, St. Marys.
Erie,	D. Warren De Rosay, Corry.
Fayette,	John T. Smith, Dunbar, R. D. No. 32.
Forest,	C. A. Randall, Tionesta.
Franklin,	J. P. Young, Marion.
Fulton,	Frank Ranck, Hancock, Md., R. D.
Greene,	J. W. Stewart, Jefferson.
Huntingdon,	G. G. Hutchison, Warriors Mark.
Indiana,	S. C. George, West Lebanon.
Jefferson,	Peter B. Cowan, Brookville.
Juniata,	Matthew Rodgers, Mexico.
Lackawanna,	Horace Seamans, Factoryville.
Lancaster,	J. W. Bruckhart, Lititz.
Lawrence,	D. L. Fulkman, New Wilmington.
Lebanon,	Edward Shuey, Annville, R. D.
Lehigh,	P. S. Fenstermacher, Allentown.
Luzerne,	J. E. Hildebrant, Dallas.
Lycoming,	B. F. Kahler, Hughesville.
McKean,	E. A. Studholme, Smethport.
Mercer,	Wm. O. Black, Mercer.
Mifflin,	C. M. Smith, Lewistown.
Monroe,	F. S. Brong, Saylorsburg.
Montgomery,	J. H. Schultz, Norristown.
Montour,	J. Miles Derr, Milton, R. D. No. 1.
Northampton,	C. S. Messinger, Tatamy.
Northumberland,	Wm. A. Fisher, Milton.
Philadelphia,	David Rust, Horticultural Hall, Philadelphia.
Perry,	C. M. Bower, Blain.
Pike,	B. F. Killam, Paupack.
Potter,	A. T. Crittenden, Oswayo.
Schuylkill,	John Shoener, Orwigsburg, R. D. No. 1.
Snyder,	F. F. Glass, Freeburg.
Somerset,	Robt. W. Lohr, Boswell.
Sullivan,	G. Eugene Bown, Forksville.
Susquehanna,	E. E. Tower, Hallstead.
Tioga,	C. H. DeWitt, Mansfield.
Union,	J. Newton Glover, Vicksburg.
Venango,	Homer C. Crawford, Cooperstown.
Warren,	R. J. Weld, Sugargrove.
Washington,	Jas. M. Paxton, Houston.
Wayne,	W. E. Perham, Varden.
Westmoreland,	W. F. Holtzer, Greensburg.
Wyoming,	G. A. Benson, Tunkhannock.
York,	G. F. Barnes, Rossville.

LIST OF INSTITUTE LECTURERS FOR SEASON OF 1915-16

Anderson, H. M., New Park, Pa.
Barnitz, C. M., Riverside, Pa.
Bechdel, S. I., Department of Dairy Husbandry, State College, Pa.
Bond, M. S., Danville, Pa.
Buckley, G. C., State College, Pa.
Campbell, J. T., Hartstown, Pa.
Card, Fred W., Sylvania, Pa.
Conard, Dr. M. E., Westgrove, Pa.
Dorsett, E. B., Mansfield, Pa.
Fassett, F. H., Meshoppen, Pa.
Funk, Sheldon W., Boyertown, Pa.
George, S. C., West Lebanon, Pa.
Gillingham, G. L., Moorestown, N. J.
Gooderham, H. M., Patton, Pa.
Groupe, J. Stuart, Jersey Shore, Pa.
Guldin, Paul R., Yellow House, Pa.
Herman, J. A., Fombell, Pa.
Herr, John D., Lancaster, Pa.
Hulsart, C. C., Matawan, N. J.
Hull, Geo. E., Sharpsville, Pa.
Lighty, L. W., East Berlin, Pa.
Lyons, Dr. Hannah McK., Lincoln University, Pa.
McCallum, M. H., Wernersville, Pa.
McCurdy, C. C., Hartstown, Pa.
Mairs, Prof. Thos. I., State College, Pa.
Menges, Prof. Franklin, York, Pa.
Myers, O. E., State College, Pa.
Noll, Chas. F., State College, Pa.
Orton, Prof. C. R., State College, Pa.
Patton, Wm. M., Mosgrove, Pa., R. F. D. No. 2.
Philips, T. J., Atglen, Pa.
Phillips, E. L., New Bethlehem, Pa., R. F. D. No. 2.
Phillippy, Dr. W. T., Carlisle, Pa.
Putney, F. S., State College, Pa.
Rosenberger, Dr. John N., Wycombe, Pa.
Seeds, Robt. S., Birmingham, Pa.
Smith, Raymond S., State College, Pa.
Stout, W. H., Pinegrove, Pa.
Struble, Vern T., Athens, Pa.
Umboltz, R. O., Sacramento, Pa.
Van Noy, Leon Otice, Troy, Pa., R. F. D. No. 66.
Watts, D. H., Kerrmoor, Pa.
Weld, R. J., Sugargrove, Pa.
White, W. R., State College, Pa.
Wittman, W. Theo., Allentown, Pa.
Wrigley, Paul I., Eddington, Pa.

PROCEEDINGS OF THE FARMERS' ANNUAL NORMAL INSTITUTE, HELD AT READING, PA., MAY 23-25, 1916.

Reading, May 23, 1916, 1:30 P. M.

Hon. Howard G. McGowan in the Chair:—

The CHAIRMAN: Gentlemen of the Pennsylvania State Board of Agriculture and Delegates: We are promised the ball-room to hold our meeting this afternoon, but we have to give way for the Rotary Clubs that are holding their session there, and probably they will not adjourn until a late hour, two o'clock or half past two, and on account of some arrangements that the Committee has made for the pleasure of the Board, we will necessarily have to get through with our afternoon session by four o'clock promptly. I am mighty glad to see so many representative men here to greet our Berks county people. It has long been my ambition to see the Pennsylvania State Board of Agriculture and the Normal Institute meet in my home county. Berks county is one of the many great counties in the State of Pennsylvania, with flourishing boroughs and rich, agricultural districts. It is said that Berks county can raise a corps of able bodied men, thirty thousand, in forty-eight hours, so we are mighty well fortified here in Berks county.

I must forego some things that I had intended to say, on account of the shortness of time. You will notice on the program there is to be an opening address by Harry D. Schaeffer, Judge of the Orphans Court. Judge Schaeffer was suddenly called to Scranton, and at the outset, in the arrangement of the program, we wanted our Honorable Mayor of the City to make this address. He could not then be secured and we went back to him, back to our first love, when Judge Schaeffer was called away. Of course he too then refused and said he had two engagements for the afternoon. Well, now, I said, "Mayor, look here, we don't come to ask you for a half hour's speech, nor fifteen minutes, nor ten or even five, we want you there to show the people your pleasant face and to welcome these representatives from all parts of Pennsylvania to the flourishing City of Reading." "Well," he said, "That's very clever and I appreciate that. If you cannot get anybody else, I will be there just for a minute;" so, in order to relieve the Mayor, who is one of the best Mayors that the City of Reading ever had, we will have to necessarily go right into the program and it affords me very much pleasure this afternoon, gentlemen, to introduce to you the Honorable Mayor of the City of Reading, E. H. Filbert. (Applause.)

ADDRESS OF WELCOME

By HON. E. H. FILBERT, *Mayor, City of Reading.*

Mr. Chairman and Delegates of the Convention and Ladies: I can assure you it is a great pleasure for me to meet and welcome you. I voice the sentiments of the citizens of Reading when I say to you that we are very glad to have you with us. We are very happy indeed that you selected our city as your place of meeting, and can assure you that we will do all in our power to make your stay a pleasant one. I ask you, ladies and gentlemen, that between your business sessions, you visit the various places of interest in and about our city. As I understand, you are about to make an automobile trip to Wernersville this afternoon, and to-morrow take a ride over the mountain; but between those arrangements, we would like to have you visit some of the places in our city. We have a public museum located in the boys' high school over in the Administration Building of the high school at 8th and Washington, and our Public Library and our stores—we feel very proud of them. I assure you that if you visit these stores and leave the managers and sales people know that you are strangers, there will be nothing of too much trouble for them to extend to you the hand of welcome and answer any and all questions that you might desire to ask.

I trust that the deliberations of your body may be beneficial to your organization as well as to the public at large. I ask you in particular to arrange for a trip over our mountain roads. From the summit of the mountains you will be able to get a better idea of our city than by being on the surface traveling from one place to another. From the summit it will give you a birds-eye view, and I am sure that you will appreciate it. I ask you, ladies and gentlemen, that when your convention is at an end and you are about to depart for your homes, that you will carry with you fond and pleasant recollections of your stay with us during this convention. Again, as Mayor of the City of Reading, I extend a hearty welcome. (Applause.)

The CHAIRMAN: In answer to the Mayor, in which he says that he hopes we will arrange for a trip over the mountains, I wish to say that we have arranged for this trip to-morrow. We purpose leaving the hotel at 11:30. And by the way I will give you the exact schedule as it has been handed to me by the Chamber of Commerce. Leave the Berkshire Hotel by trolley at 11:30; leaving Mount Penn Gravity at 11:45 arrive at Kuechler's Boost at 12:15; leave at 1:10 and arrive back at the Berkshire in time for the afternoon session, 1:40. This has been arranged for kindly by the Chamber of Commerce, with this exception; luncheon has been arranged on the mountain top at Kuechler's Roost and that will cost the sum of 50 cents. This will not interfere with the hotel people here, the charges will necessarily go on at the hotel, but the Secretary of the Chamber of Commerce

thought that the trip would no be rounded up well unless we took this little journey up the mountain, so as many of you who can go along we hope you will; if there are some few who cannot go for various reasons, it is all right. Transportation is entirely free with the exception of the luncheon on the mountain.

While I am making these announcements, I want to say that there has been a trip arranged for leaving here at 4 o'clock to go out to Mr. Orr's Sunnyside Farm, I think it is, by way of the Almshouse and Schillington on to Wernersville to see those beautiful hills and the Sanitarium there; coming in by Sinking Springs and arriving back at Reading by 6 o'clock. Automobiles have been offered kindly by the citizens and business men of Reading, so the transportation is entirely free. You are all welcome to go along. We hope to have automobiles in front of the hotel to accommodate all the members of the Board, their wives and delegates as well.

Next we will have words of welcome from James P. Hennessy, President of the Berks County Agricultural and Horticultural Association. He has just arrived.

ADDRESS OF WELCOME

By JAMES P. HENNESSY, *President of the Berks County Agricultural and Horticultural Association.*

On behalf of the Agricultural interests of Berks county, I bid you welcome to Reading, noted far and wide for its hospitality to the stranger who comes into their midst either as a transient guest or a permanent resident. The Committee of Arrangements, headed by our worthy Chairman, Howard G. McGowan, has arranged an interesting program for your entertainment between the sessions of the Board, which includes several trips through the county, and I am sure that what you will see will make a more permanent impression than anything I can say for our right to call Berks county beautiful. What you will see on the several trips will also impress you, I am sure, with the ability and intelligence of our farmers and show you the reason why Berks county stands so close to the head of the list as an agricultural county, despite the fact that the county stands third in the State in the value of its manufactured products. While our Berks county farmers, and I might add, not only the farmers but the business and professional men of the county, are noted for their conservatism, yet I am sure you will agree with me that while they are conservative, they are progressive in a good, sound, solid way. And the best proof I can give you of their progressiveness is what you will see when you visit our beautiful new Fair Grounds on your automobile trip which has been arranged for. The Berks county farmers are proud of the fact that you have selected Reading to meet in and I know you will go away feeling that it is a good place to come to,

I cannot let this opportunity pass without saying a word for the good work that the State Board of Agriculture has been doing. I have been in close touch with the work; and I also want to say a word for our Berks County Farm Bureau, and if any of the delegates from any of the counties are not already organized, I believe it would pay them to look into what our Farm Bureau has done in the county before they go home. I just mention this because there is a movement on foot now to organize a number of counties and the County Agriculturalist did so much good for Berks county that I would like to see the same thing in other counties. (Applause.)

The CHAIRMAN: We certainly appreciate the many courtesies extended to us by the Chamber of Commerce in the way of furnishing us with these splendid ornamental badges here and the souvenir program. I am mighty proud to announce that we have with us this afternoon the President of the Chamber of Commerce, who will now have a word of welcome to extend to us. I have reference to Mr. Frederick Wilson. (Applause.)

ADDRESS OF WELCOME

By MR. FREDERICK WILSON, *President Chamber of Commerce, Reading, Pa.*

On behalf of the Reading Chamber of Commerce, we bid you a hearty welcome. We hope you will feel at home in this city and we all want to do our utmost to help make you feel at home. When all is said and done, we realize that the great first source of wealth is agriculture, and while we business men may take the fruits of agriculture and work them up into finished products of various sorts, we nevertheless realize that the first production lies with you gentlemen. Yours is the first source of wealth and we give you due credit for it.

In these days you hear a great deal about efficiency in manufacturing. The business man is very much concerned with making his business more efficient by labor saving processes, by cutting waste in the various forms, and it is a matter of great interest to us to observe that along with the new methods in manufacturing, new methods in agriculture are also coming in, labor saving methods, methods bringing about greater production of crops, better crops, finer products, better stock and in every way increasing the profits as well as the pleasures of farming. One of the most important steps towards the efficiency of agriculture, I take it, is the improvement of your roads, and it is pleasing to see that in all parts of our wonderful and beautiful State, there is a great improvement in the roads.

It has been my fortune to travel quite a little within the last few years in other states, and I noticed that wherever the roads have been improved, there has been a great influx of people from outside, visitors passing through the state from end to end, passing through the country districts, the villages and the cities, observing and commenting on

the appearance of the agricultural districts. I am sure that the improvement of roads will not only greatly assist the farmer himself and assist those who live in the various centers in our State, but will also induce others from the outside to come into our State; and those from any State in the Union who once visits Pennsylvania cannot but go away convinced that we have a wonderful and beautiful State, rich and fertile, worthy of all the ambition and all the energy and all the best that is in us, whether we be in the cities of Pennsylvania or whether we be in the country districts.

In behalf, then, of the Chamber of Commerce, I want to say, in a homely way, "Howdy" folks, and to say we are glad you are here and we hope you will enjoy your stay and come again. (Applause.)

The CHAIRMAN: We certainly appreciate the words of welcome that we have listened to from these three worthy gentlemen. I am pleased to say now that we will have two responses, the first one from the new Secretary of Agriculture. You have not looked into his face yet; I have reference to the Hon. Charles E. Patton, Secretary of Agriculture, Harrisburg. (Applause.)

RESPONSE TO ADDRESSES OF WELCOME.

By HON. CHARLES E. PATTON, *Secretary of Agriculture, Harrisburg, Pa.*

Mr. Chairman: I deem it both an honor and a privilege to respond to the most cordial words of greeting from your Honor, the Mayor, and from the Presidents of the Berks County Agricultural Society and the Reading Chamber of Commerce. I am sure that I voice the sentiment of all the members of this body when I say that we are glad to be here. Your words are but expressive of the hearty welcome already received as we found your doors open to admit us when we entered your busy city.

Your county is one of the ancients in the line of counties, originally belonging to the first county created by Pennsylvania's great Founder. Possibly no county in Pennsylvania, so far as its colonial history is concerned, was more cosmopolitan than what is now the county of Berks.

You have here a city of large manufacturing industries, and in the county agricultural conditions second to none in the State. You of the city take more interest in agriculture than any city of its size that I know of, and you are doing the right thing, for the welfare and prosperity of any nation depends upon her agriculture.

The membership of this Institute is made up of a Chairman from each county, Farm Advisers and Institute Lecturers. We are here as the representatives of 215,000 farmers and have met to review the work of the past year in this State. Our people do not seem to realize the importance of agriculture. We are looked upon as a

great manufacturing state, which we are, and also, a great coal mining state. These industries seem to have overshadowed agriculture, and the people do not realize that agriculture is the greatest one industry that we have in the State of Pennsylvania.

The coal output in the greatest year of the State's history was something like \$395,000,000.00, this the price at mines, being fifty-four per cent. of all the coal mined in the United States that year. In the manufacture of iron we stand at the head of the Nation, producing about 12,000,000 tons of the 28,000,000 tons manufactured in the United States.

Agriculture produces every year in the State of Pennsylvania products worth over \$400,000,000.00; that is the price of the product received by the farmer, not what the consumer pays for it.

From this you can readily see that every working day in the year there is sold on an average by the farmers of the State \$1,300,000.00. I would say that at least \$1,000,000.00 goes back into the avenues of trade, so that the transactions arising from agriculture amount to over \$2,000,000.00 for every working day in the year. There was paid out by the State last year alone \$40,000,000.00 for male farm help, your county here paid over one million and one-half for help.

The State of Pennsylvania stands about sixth in the United States in agriculture. We have what is different from most states, in that we have more of a diversified production. Most of the states are what we call one crop states. Take Illinois, Indiana, Missouri and Iowa, their main crop is corn; take the Dakotas, Minnesota and the Northwest they are in the great wheat states, the Southern states, cotton and tobacco are the main crops, virtually all their agriculture consists of one item, while in Pennsylvania four or five of the leading cereals are very close together in valuation; so that if we have a failure of one crop it does not affect us as much as it does where it is virtually a one crop state.

We believe that the success of agriculture will depend upon the co-operation not only between the farmers themselves but between the farmers and the consumers, and the Department of Agriculture is working to that end. We have taken up the organization of a Bureau of Markets, and through that Bureau expect to help both the producer and the consumer.

The CHAIRMAN: We have with us one of our Farm Advisers. Many of you have looked into his face already and you know him quite well. I am pleased to introduce to you now, ladies and gentlemen, E. B. Dorsett, of Mansfield, who will also respond to the welcome that has been extended.

RESPONSE TO ADDRESSES OF WELCOME.

By E. B. DORSETT, *Farm Adviser, Mansfield, Pa.*

Mr Chairman, Mr. Secretary, your Honor, Ladies and Gentlemen: Some years ago a minister went home with a farmer member of his little flock for dinner, and while the good wife was preparing the chicken and other things fit only for ministers to eat, the farmer

was entertaining the minister with his deeds of valor during the days of the Civil War. He went on for an hour and a half and finally, when there came a lull, the little boy looked up into his father's face and said, "Father, didn't anybody help you put down the Rebellion?" And as I thought of these gentlemen in the good old county of Berks, I wondered whether we had any other counties in Pennsylvania or not? (Laughter and applause.) Then, too, your Honor and Mr. Chairman, I would not give much for a man who would not stand up for his own county, for his own state and for his own nation. I believe that Pennsylvania is the best state in the Union, (applause) and I believe that the United States of America is the best country on the face of the globe, (applause) and I believe that today we ought to be indeed grateful that we are at peace with the world.

Now we are here today, as has been suggested by these many people, as representatives of one of the greatest callings known to man, and I was pleased to know that our good friends here in Reading recognize the fact, because it has not been so many years back that agriculture received its just recognition from the hands of our friends in the towns and cities, and I believe it is a hopeful sign when the farmers can mingle, as we are mingling here this afternoon, with the other industries in our great State, and I believe too, that much good will come out of a meeting of this kind and I have often wondered whether it would not be a good thing for the Chambers of Commerce and the Boards of Trade throughout the Commonwealth if they would invite some of these hard-fisted old farmers to join their organizations, let them come in and take part in their deliberations and see if we cannot get on some common ground where we can agree.

We are here this week to discuss problems of great moment, problems which affect us all, no matter where we live, no matter what we do, but problems which affect the very life and existence of the people of this great Commonwealth; problems, as you will see by looking over the program, relative to roads, to animal husbandry in all its different phases, to poultry culture and horticulture. All of those problems are of vast importance and mean much to us all. It is not likely that we will arrive at the correct solution of them all, but you know that in a multitude of counsellors there is wisdom, and I feel that we here, the Chamber of Commerce and the Board of Trade and the various societies of this city discussing these problems with us, will bring out some thought, some point that will be beneficial to us all.

The one problem that I think you will be interested in was referred to by the Secretary, that of marketing that which we now produce. Yesterday in the great city of Philadelphia I spent an hour or more with a representative of the Department of Agriculture who belonged to the Market Bureau, and I learned something of what their plan or system is. He showed me the telegraphic reports which came in there every morning and what use they made of them, and the thought came to me then, as it has many times in days gone by, why cannot we farmers have these reports just as well as the man in the city who is handling our products. I am not here to criticise, not at all, the Department of Agriculture in that respect; it is doing a great work, but I say that much of that will be lost unless the farmer gets it

I believe that the National Department of Agriculture and our State Department of Agriculture should work in the interest of the farmers, not that we should be selfish, but I believe when we do anything that shall help the farmer, then the man who lives in the town and the city is bound to get part of it, and so my thought was, as I looked over those reports and was told what was done with them, what a pity it is that we do not at this present moment in Pennsylvania have a Bureau such as was referred to by our Secretary, where those reports could go out every day to the farmers of Pennsylvania, to the various organizations, to your Farm Bureaus, your granges and your farmers' clubs and your farmers' unions and even to the large farmers individually. I believe that is the way to keep the farmer in touch with the markets of the world.

One of the things that interested me in those reports was the number of cars that are leaving the stations each day, and giving their destination. I noticed that over in Arkansas day before yesterday, a hundred and thirty some cars of strawberries were shipped out of the state and a hundred and some out of Tennessee. Well, now, the point is here: In this State when we have this Market Bureau of Information or whatever it may be called, by a system of telegraphic and telephone reports, we can tell each morning just how many cars of farm products were moved the day before and to which point. Perhaps we can so regulate it that we can even get it down to smaller shipments, and in that way we can keep the farmer in touch with the markets of the world and at the same time prevent that glut that we sometimes have, so often have, in our markets. Then, again, I believe that by a system or organization such as will doubtless be discussed tomorrow, that it will be possible for the farmers to so organize and store their goods at home in inexpensive warehouses, that they can hold them for a length of time and not be obliged to sell at a time when the market is glutted or at low ebb. Then, again, we are now at the present time in Congress and have been for some time studying a rural credit system. I am not going to discuss it this afternoon, but I want to say to you farmers that we have it within our own power to establish a credit system that will meet all our needs and demands and be far superior to anything that has yet been suggested in Congress. I believe, too, that by a system of warehouses, for instance, where they grow potatoes like Lehigh and part of Berks, or apples like Adams county or Butler, or milk like Tioga and Bradford, or tobacco like they have in Lancaster, where they have those organizations and the warehouses can be established and the farmer who needs the money puts his goods in the warehouse and takes a warehouse receipt and that receipt shall be collateral at any bank if he desires to borrow money. What better credit system do you want than that? And that is ours.

Why should the Government go into a banking business and why should the Government lend the farmer any more than lend to anyone else? I cannot understand. I think that Uncle Henry Wallace was pretty near right when he said that all they want is to make it easier for the farmer to get into debt, and so I think that we here, who represent this great calling, have it within ourselves to settle many of these problems. And for one, I am very glad, your Honor, to have the privilege of responding to your words of welcome and I assure you that they are heartily appreciated and we hope that our

short stay here with you will be both pleasant and profitable and that when we have gone back to our several homes, you will feel that our coming left a little ray of sunshine and that, as the days may come and go, the friendships which shall be begun here this week will ripen in the future and bring forth much fruit. (Applause).

MR, FIRST: If you feel that it would be politic, we can change to that room now before Mr. Anderson talks. Do you think it is better to continue the meeting here?

The CHAIRMAN: I leave that to the sentiment of the audience.

On motion, the meeting was changed to the larger room.

The CHAIRMAN: Now, gentlemen, we have spent half an hour very pleasantly listening to words of welcome and responses, and we just have one hour and a half to devote to a very practical subject, namely, Potato Growing. We think that we can very profitably to all of us consume this time. It is a subject that we all want to learn just a little bit more. The Secretary has just told me that he will deliver slips and lead pencils and upon them you are to ask your questions, or you may feel free to just interrupt the speaker and ask them from your seats. This will be conducted just the same as a farmers' institute, and you all feel at home at farmers' institutes all over the State. We have had Mr. Anderson with us in Berks county, and all of us enjoyed his practical talks very much. I don't know whether I have met Mr. Anderson; I suppose he is in some corner of the room. I now have the pleasure, ladies and gentlemen, of introducing Mr. H. M. Anderson, of New Park, who will talk to us on "Potato Culture."

Mr. Anderson then delivered the following address:

POTATO CULTURE

By H. M. ANDERSON, *New Park, Pa.*

Mr. Chairman and Friends: I hope you will be a little bit lenient, because, when I accepted this invitation, I expected to make an elaborate speech, but you know just how much time a practical farmer and fruit grower has to devote to speech-making, and I may say as a matter of fact, that I made my speech yesterday morning before breakfast, and I am just going to talk in an informal way about some of the factors that enter into profitable potato growing.

I will speak, first, about the markets and the soil that you are farming; they are not under our control, but they should be taken into consideration. If I was sure of a good market, I would undertake to grow potatoes at a profit on practically any soil in the State

of Pennsylvania, only demanding that it was well drained or could be well drained. On the other hand, if I had a soil that was well adapted to potato growing, I would undertake to grow potatoes at a good living profit no matter what the market conditions were; I would undertake to find a market if I had the proper soil, but if you haven't got either the market or the soil, you don't want to go into potato growing because you are fighting an up-hill battle all the way through.

Another thing that must be taken into consideration but is not under our control is the weather. The weather I believe is of all things the most variable and on the whole at least dependable. Yet it was Noah that the Lord promised that seedtime and harvest should not fail in the earth. I have noticed that farmers who make conditions right at seedtime and practice the right sort of cultivation in the spring during the growing period of the potato are going to show up mighty good and strong at the harvest end of the proposition, and you have only got to do your part and trust weather conditions to the Lord and you are going to make money out of potatoes if you have either a good market or the right soil.

Now I will take up in a little more in detail the factors which are under our control and must be taken into consideration first. I will discuss the vegetable matter in the soil, the conditions which we can change at will. The greatest essential proposition to successful potato growing is plenty of vegetable matter in the soil. I do not think we can put too much emphasis on that. I have been spoken of as a crank on that subject, but that is not such an opprobrious name after all because a crank is instrumental in turning things and if we could turn the farmers from some of their old methods to some of the methods we would like to turn them to, we are going to wonderfully aid those farmers in making money on their farms. I don't care how you get vegetable matter into your soil, but by all means get it. I believe that Solomon said you should get wisdom and all things would be added thereto. I believe that if Solomon was living today and was speaking at a normal institute, he would say, "Get vegetable matter, get humus and all things will be added thereto," because there isn't anything so necessary to successful farming, successful potato farming as vegetable matter. Those who feed cattle can get vegetable matter in the way of manure. Those whose conditions are such that they cannot go into that line, can get all the vegetable matter they need by cover crops.

We have been trying to get it both ways. At my home, in my vicinity, I came over from York county, from York County Barrens; those who have been in that part of York county probably have not been able to recognize it as "barrens," but that has been due to the use of crimson clover as a cover crop during the last 28 or 30 years. And then another feature in our farming, we have taken the York County Barrens and made that land one of the most fertile spots in Pennsylvania, and no other feature has been as important in that work as the use of crimson clover as a cover crop following the corn. Now I know that a lot of people here will say, "We cannot grow crimson clover." If you cannot grow crimson clover, you can grow red clover, and if you cannot grow red clover grow sumac, get a legume if you can; if you cannot get a legume, grow rye. You must

grow cover crops of some sort, a leguminous crop by preference, of course, but if you try it and demonstrate to your own satisfaction that you cannot grow a legume, grow some other cover crop, but get a cover crop to plow into your soil, no matter how you have to get it. Perhaps that is enough along that line.

Now I want to talk a little about the preparation of the soil. I don't think I will say very much about the plowing of it, but I do want to say a few words about disking the soil before it is plowed. I think it is a serious enough matter to disk that soil before it is plowed, to buy a tractor with that idea in view more than any other one thing. I bought a tractor and an engine disk, double acting disk, particularly to disk my ground ahead of the plow and I am sure it is going to be a paying proposition. Of course I need the engine for belt work and expect to do some plowing and some other farm work with it, but I bought it primarily to disk the ground ahead of the plow. You say that shouldn't be necessary, take the team and do it. Those who have done it with the team, don't want to do it the next day, it is practically a horse killer, you have got to have a good team and give them plenty of time, and I have always felt too kindly to my team to hook them to a double acting disk and ask them to disk before and after the plow, but the tractor does not get tired and does not get over-heated. I have a friend in our part of the country who tells me that during the past five years he has been disking his potato ground and growing 50 more bushels of potatoes per acre through that disking ahead of the plow that he could have done without it. I'd rather talk about doing something like that myself than talk about somebody else doing it; moreover, I'd like to have had those extra 50 bushels of potatoes; I'd like to have had them myself, but I felt too kindly to my team.

A Member: Is he growing them on sod?

MR. ANDERSON: No, he is growing them on corn ground. I have not been on his farm recently, he just made that statement to me, that he had proven during the past five years that he could grow 50 more bushels of potatoes per year by disking the ground ahead of the plow, and it is reasonable to suppose that you could materially increase the crop in that way, not only have a mellow seed bed on the surface, but below the surface.

A Member: What kind of soil is that?

MR. ANDERSON: A red clay loam. A good deal of his soil has more or less gray stone.

A Member: It would not be necessary on sandy soil?

MR. ANDERSON: No, I don't think it would, but on heavy clay loam, it would be practical I am sure. I want to say that you should plow a little bit deeper every year until you can get a good, deep seeding bed. The average farmer in Pennsylvania is plowing about 5 inches deep, and after he has plowed, he will harrow up possibly

two or three inches of the surface. The other part is never stirred at all, never prepared in any way for the growing crop. Then, during the cultivation period, he is going to cultivate those two or three inches time after time and make it so that the roots cannot exist in that surface soil. The only chance those potatoes have for moisture and plant food is in those two or three inches of ground that have never been prepared in any way. How much more practical it would be if we would make that furrow two or three inches deeper, and disk it before you plow it. You have got to have a soil that is loose and open and porous if you are going to grow a profitable crop of potatoes.

The CHAIRMAN: How deep ought the potatoes to be covered?

MR. ANDERSON: I don't like to cover them a bit deeper than I have to, but I do like to have them planted as deep as I possibly can, and for that reason I run the shovel plow ahead of the planter and set the disk following the planters just as straight as I can and still get the potatoes covered by an inch or a couple of inches of soil. I thought two or three years ago that I was going to improve on those disks and I took them off and put cultivator teeth on in place of them behind the chew of the planter and thought I was going to get an inch or an inch and a half of soil over all those potatoes, but I found that I could not do as good work with the cultivator teeth as with the disk, so I took them and put the disks back on but set them to cover the potatoes as shallow as I possibly could. I want the potatoes six or seven inches deep and covered about an inch or an inch and a half.

The CHAIRMAN: Do you advise rolling your field?

MR. ANDERSON: I do not believe the roller has any business in the potato field at all, and we do not want to pack that soil a bit more than we can possibly help. There are times when a drag, or roller can be used; but I think it is about the last instrument to take into the potato field. We want to harrow it some but no more than we have to before it is planted. People say harrow it as thoroughly as you possibly can, but those who are growing potatoes early, and you have got to grow them either early or late, find that the soil is pretty moist and will pack pretty hard through the tramping of the horses feet and the wheels of the machinery you use during the early part of the season, so I do not like to harrow any more than I have to, to get the ground in fairly good condition before it is planted. After it is planted, I believe that the first cultivation is another of the most essential features in potato growing. I think that first cultivation should follow the first good rain after the potatoes are planted. I cover them shallow in the first place because I want the sun to warm up that piece of potato and get the sprouts started and get the plant started as quickly as I can. I find that by covering it an inch or two, I can get the potatoes to come up a week earlier than when they are covered five or six inches deep, and we want to push the growth of that plant as much as we possibly can and I do not like to use that first work any sooner than I can possibly help, but I think it is so essential to follow the rains with cultivation, and

after the first good rain I get in there with a two-horse worker and work the rows as deep as they will stand, and I would like to work it four inches deep if I could and I do go as deep as I possibly can. I want to loosen up that soil which has been packed by the harrowing and the planting of the crop, I want to get it loose and open. I think it was about seven years ago that we began that practice down in the lower end of our county and that was a year of very severe drought; the best farmers in that part of the county that year grew about 100 bushels of potatoes to the acre; there were only six of them and practically all had used that method. I remember very distinctly that I went out to visit an old uncle of mine one day after my potato crop had been harvested and asked him how it was, and he said, "I had 110 bushels on a measured acre." I said, "I guess you worked them before they came up like the rest of us." He said that he did not. So I asked him what he did do and he said, "I walked over the patch one day and the ground was so darn hard that I just went in and got a new shovel plow and hooked the horse to it, and one horse couldn't pull it and I got another and just raked it furrow deep on both sides of the row." Of course he got results just as the others did. Another of those gentlemen was a neighbor on an adjoining farm. He gave them that deep work; he worked four acres of them and because of a period of wet days he failed to get the other three acres worked, on account of that series of wet days, but on the four acres he worked, he grew 100 bushels per acre; on the other three that he did not work, he grew about 71 bushels per acre. He said that the ground had all been farmed and fertilized the year before and that every condition, so far as he knew, was exactly the same on the whole seven acres, except that the four acres had that one deep cultivation before they came up and the other three did not; the season was the same and everything, and he said he knew no reason at all to which that was due except that one deep cultivation.

A Member: Were these planted late?

MR. ANDERSON: They were all planted early; all were planted inside of three days. Now I know in planting later you do not make the soil so hard, but we find that if we are going to grow profitable potatoes down in our county, we have got to plant them as early as we possibly can, we have got to avoid that very hot, dry weather during July and August and get our potato crop ahead of that as much as we can. The farmers who plant first, cover shallow and push the crop by quickly available fertilizers all they possibly can, are the fellows making the money out of potatoes with us, and I think it is true all over the state just about the same as it is with us.

A Member: In our section late planting of potatoes is a profitable crop.

MR. ANDERSON: Are you far north?

A Member: About the central part of the State, altitude about 900.

MR. ANDERSON: We are further south. You must plant either early or late; if you want to get maximum results, you must get away from that hot dry weather. Last year we had our crop cut in half by very hot weather during July, the early part of July. The potato crop throughout our part of the country was practically ruined in two or three very hot mornings. We want to get our crop as far advanced as we possibly can. We found that early potatoes made a fair crop, while later varieties planted at the same time did not make much over half a crop, simply showing that the further you can get your crop advanced before the hot weather, the more you will grow.

A Member: Isn't cool weather the best condition for maturing our potatoes?

MR. ANDERSON: Yes, sir, and the best condition for growing potatoes. I have to harvest apples and corn, so I must plant early. I have planted early and planted late, but I have made more money planting early. If you have made more money by planting late, plant late by all means.

A Member: What do you call late in your locality?

MR. ANDERSON: Well, I planted McCormick's on the Fourth of July; that I would call pretty late.

A Member: When did you harvest them?

MR. ANDERSON: I had to tear them out to get the wheat ground seeded to wheat before they would mature; if I had ground that I did not want to seed to wheat, I would try such a late growing crop as the McCormick's and would try planting them late and make some money by planting that way, but you must avoid as far as possible that hot dry weather if you are going to grow a good big crop of potatoes

A Member: The early crop always gets the hot weather?

MR. ANDERSON: Yes, but they are pretty well advanced and practically grown. If you grow an early variety and plant it early, you will have them mature in August, ready to take out the first of August. We have them practically grown before this very hot, dry weather comes in. Sometimes we get caught: there is nothing sure, you know, except death and taxes and I don't like either of them.

A Member: What do you call early planting?

MR. ANDERSON: Just as soon as the ground is fit to disk we disk it and then plow it immediately; we prepare it and get them planted as quickly as we can. This year we didn't get them planted until the first of May; ordinarily we get them planted by the first of April or 10th of April.

A Member: No matter what the weather, you plant every day?

MR. ANDERSON: Yes, every day earlier means earlier maturing of a bushel or more in the crop.

Now let us go back a little and take up the seed itself, because that is another thing very essential to potato growing. I think it is ten years ago that I first selected seed potatoes by hill selection. I went into the field of potatoes which was making 250 bushels to the acre, took a fountain pen and a note book and a set of scales and a few crates and went down through that patch and dug hills which appeared to be good, healthy, strong growing hills, but I did not take any hills which do not have a hill growing on each side; I wanted only good and healthy hills that had normal conditions surrounding them, and if I took a hill which had no hill growing on the other side, of course on one side it had a little better chance to grow. I always plant with a planter and plant 32 by 14 inches. I dug probably 200 or 300 hills in a patch; I dug the hills that appeared to be the best hills I could find. Out of those 200 or 300, I selected 70 hills which produced at the rate of between 450 and 760 bushels per acre. Some of you perhaps will be a little surprised to know that there is that much difference in a crop of potatoes. You have a field that is making 250 bushels to the acre and you think most of the hills are producing at the rate of 250 bushels to the acre. I thought so too, but when I went in there with the scales and dug and weighed the crop, I found that I had hills producing 66 bushels per acre and other hills that were producing 766 bushels per acre, there was just that much difference, under the same conditions so far as I could see, due entirely to the difference in the seed. That showed me the value of hill selection in potatoes. I selected 70 of these hills. On the largest potato in each hill I marked with my fountain pen the number of the hill and the number of potatoes in the hill and the number of ounces that hill produced.

Now each potato from hill No. 1 for instance, had the number of the hill on it and the largest had those other figures, the number of potatoes and the number of ounces. The potatoes from each hill were put in a crate and a piece of paper laid over that part of the crate, and hill No. 2 was put in the same way, and in that way I put about 17 hills in each four crates and put them away for planting next spring. Of course I kept a record too, in my note book of the productiveness of each hill and the crate in which it was placed. The next year I planted those potatoes by hand; I put a numbered stake at the beginning of each hill. Those stakes were possibly two feet high, in fact, they were a little too high to get over the ground with a two-row worker, and consequently I had to work them with a one-horse cultivator. I had to discharge one of my hands and we were building a local railroad in the community and home labor was almost unobtainable and you can understand why I only worked that plot of potatoes once while I worked my main crop three or four times. The main crop I worked with a machine. But from the seed plot, those 70 hills planted on exactly one-sixth of an acre, produced 57 bushels of good marketing potatoes, or at the rate of 342 bushels to the acre. My main crop made me 240 bushels to the acre. There you had an increased yield of 142 bushels of potatoes due, so far as I know, to better seed, in spite of the fact that it did not have the

cultivation it should have had. I believe that if that plot of potatoes had been cultivated as well as the main crop, they would have gone nearer 400 bushels than 340. Of course the next year I used those 57 bushels for seed and the rest of my seed was taken from the main crop. Where I used those 57 bushels, I had 35 to 40 per cent. more potatoes than where I used the rest of the seed. I do not know that that was due entirely to the merits of the seed, because they were planted a few days earlier than the others. Since that my seed has all been taken from the selected seed and I have not been able to trace that special lot further than the two years, but I am fully convinced that I have derived hundreds, I might say thousands of dollars from that two or three days work I spent in selecting those seed potatoes, and it is possible, in fact it is necessary for every farmer to do the same thing. It is necessary from the point of view of keeping your seed clean, keeping out the diseases which are being introduced every year from Europe and from other foreign countries. I will take that matter up later, however.

I just wanted to add that as another reason why hill selection is absolutely necessary now-a-days. They tell us down in York county that we are foolish to use our own seed potatoes, but I want to say that until I get as uniformly good crops from northern grown seed as I can get from my own selected seed, I propose to use the home grown seed for the main crop at least. I have bought northern seed occasionally, but I buy in a small way to see if it shows up good. I am using at the present time a variety I bought in Michigan four or five years ago, and am trying to breed them up as I did the others, which were a long and I found not a very marketable potato. I have got to start all over again with a new variety, but I think it is a much better variety fundamentally and that it will pay me to do that.

A Member: How did you cut those seed?

MR. ANDERSON: Just as is customary in ordinary field practice. The idea was to put about 12 or 15 bushels to the acre, that is on good large potatoes they were cut with a single eye, if they were smaller, they were cut with a couple of eyes; you get a seed block of possibly an ounce.

A Member: Did you plant the hills 14 inches apart?

MR. ANDERSON: Yes, sir. I have conducted a few experiments along the line of cutting, too. I think it is about 5 years ago that I tried my first experiment along that line. I planted three rows side by side with the same fertilizer conditions and every condition the same as far as I know. One row was planted with potatoes cut to one eye; the row beside it, with two eyes and the next row was planted with small, whole potatoes. That year I got 40 bushels per acre more potatoes from those cut to two eyes than from those cut to one eye, using about 11 or 12 bushels of seed to the acre. Where I planted the small whole potatoes, I got about 50 bushels more per acre than I got from those cut to the single eye. I tried it out a number of years after that but did not have the same weather conditions as that year nor as good soil and I have not found that small whole

potatoes are as profitable as large potatoes cut to two eyes. I have tried cutting them to one or two eyes on other occasions and have uniformly cut too large pieces of potatoes. I believe that 15 bushels to the acre will give you 30 bushels per acre more than 10 or 11 bushels will give.

A Member: Would it be advisable to use small potatoes every other year?

MR. ANDERSON: If you have good soil and a good season, you can grow more from small potatoes and large potatoes, but if you don't have good conditions, I think you will find that where you cut to one or two eyes you will have more marketable potatoes. Where you use small potatoes, if everything is right, you will have a whole lot of bushels, but you have got to have everything right.

A Member: You say you plant 32 by 14 inches?

MR. ANDERSON: Yes, sir.

A Member; How can you get that amount of seed on an acre?

MR. ANDERSON: That is what you usually put on, 15 or 17 bushels to the acre. After we get up near the seed end, we simply cut it in two and each of these pieces will have probably three or four eyes. We do not divide the potatoes up so that each piece has only one eye, of course that would not be practicable but we tried to get a uniform sized block of potatoes and if the potatoes are large you cut with a single eye down at the lower end where eyes are scarce, and then cut the upper end about the same size.

A Member: When you speak of the small potatoes, how small do you mean?

MR. ANDERSON: I mean potatoes that are not marketable. We think we can market potatoes the size of an egg. When I speak of small potatoes, I mean smaller than the marketable size. Generally all the potatoes will come up but not always. You will always notice that the eyes next to the seed end will sprout first and frequently the eyes near the butt end will sprout and not come up at all. If weather conditions are right, too many will come up; that is the objection to planting small potatoes and you will have a good many more small potatoes than marketable potatoes.

A Member: Do you find that the end containing the terminal butt will come first if that is cut cross-section and give the other end a chance?

MR. ANDERSON: Certainly it won't, but where you plant the whole potato, the seed end eyes will come first

A Member: You won't get many more vines?

MR. ANDERSON: From a small whole potato?

A Member: No, because the sprouting end, the terminal butt will exhaust the vitality of the other end.

MR. ANDERSON: I know you won't get many from the butt end of the potato, but you will get too many from the seed end. Perhaps you have your hills wider apart.

A Member: Twelve inches.

MR. ANDERSON: Well, it is just the same thing. I would suggest that you cut your potatoes like I cut mine, by hand. I wouldn't let a man bring a potato cutting machine on my farm and use it, if he would do it for nothing and board himself. I want to hold the stem end next to me and cut from slightly above the eyes toward the butt end of the potato, just as you would sharpen a pencil, in this way, have the seed block back of the eye so that the plant food can push right up and out and develop a plant as quickly as possible. If you cut the other way and have practically none of your seed block back of the eye, you have practically none of that block of seed available for plant food for that plant until it gets its root system established.

A Member: You get five or six pieces from one potato, don't you, cutting that way?

MR. ANDERSON: A large potato, yes, sir.

A Member: What do you use for fertilizer?

MR. ANDERSON: Well, we didnt use potash this year. We always have used it in the past but we did not use it this year.

A Member: That is why I asked that question. A friend of mine in the county has been growing potatoes for some years and rather successfully, he grows generally 225 or 250 bushels per acre, and I have been growing some and using complete fertilizer and stable manure and corn stalks, and he told me that he was not using anything but stable manure and sixteen per cent rock, half a ton per acre.

MR. ANDERSON: Sixteen per cent. rock is pretty good stuff to grow potatoes with. With my experiment I got more potatoes to the acre, I think a third more, from 16% rock alone than from a complete fertilizer of an equal number of pounds. That was a conundrum to me, too. I had eight or ten plots of different analyses. I fixed the fertilizers myself; I could not give you the exact analysis of any one of them, but I used muriate of potash, high grade tankage, nitrate of soda, but where I had an analysis of three, eight and five or three, eight and seven, I did not get as good results as I did from 16% rock alone. That was the first year. Next year I repeated that experiment and got better results from a complete fertilizer.

A Member: Was the humus in the soil the same in both cases?

MR. ANDERSON: No, the first experiment was on a poor piece of land and the second was on good land.

A Member: From the humus you have got the vegetable matter there.

MR. ANDERSON: But we did not have the vegetable matter in the first experiment: I don't know why, but for some reason that rock gave me better results than where I used rock fertilizer for the phosphoric acid. In the other plots, in every place where I used rock, I got better results than where I got my phosphoric acid from bone or some other source; but the next year's experiment did not bear that out. I simply give that for what it is worth; the matter was brought out by Mr. Herr.

MR. HERR: What would you say to this fertilizer; stable manure and cornstalks ground with half a ton of 16% acidulated rock?

MR. ANDERSON: That is all right; the stable manure furnishes more potash than phosphoric acid, and more ammonia. He was getting a complete fertilizer all right; his stable manure was high in the other two elements and his rock gave him plenty of phosphoric acid. He really had, he probably did not realize that he had, but he really did have a complete fertilizer when he combined the two, and that is what you want to grow potatoes if you can get it. This year you have got to grow potatoes without potash.

A Member: Isn't it regulated by the moisture in the soil during the growing season?

MR. ANDERSON: Yes, sir, very largely.

A Member: If you combined either the one or the other, would you rely on acid phosphate?

MR. ANDERSON: Yes, sir, it is a little bit the cheapest form and it takes a very little bit of lime to neutralize the acidity formed by the phosphoric acid. I am a very good friend of 16% dissolved rock.

A Member: In that rotation, you would be sure to have clover?

MR. ANDERSON: Yes, sir, and be sure to have crimson clover and the corn.

A Member: And you would have unleached manure?

MR. ANDERSON: I would like to have, yes, sir.

A Member: Is it practical to follow potatoes with potatoes?

MR. ANDERSON: No, it is not practical; the only objection is the disease, which you will find will drive you out of business. I know that people are practicing a three year rotation of potatoes, clover and wheat and are making money at it, but sometime those fellows are going to quit and quit at a loss, because they will find, that potato

diseases will put them out of business. You cannot keep your field clean incidentally growing potatoes in a three year rotation; you have got to have clean seed and clean soil if you are going to avoid these diseases. If you once get them into use, you will find that they are there waiting for you the third year and may be they are waiting for you the fifth year and that is where it grinds all of us.

A Member: In using stable manure, when do you apply it?

MR. ANDERSON: I would apply it to the timothy crop or mixed hay crop preceding the corn. I would grow a good crop of hay, plow down a good heavy sod of corn; I would grow just as much corn as if that manure were applied direct and grow pretty near as many potatoes on that cornstalk ground as if I applied that manure direct to the potato. I do not believe the place for manure is applied direct on the potato crop at all; I have not manured potatoes direct in ten years. I do not think I have. Corn is a gross feeder, plant and will work up the manure right enough. We find that by putting the manure under the hay crop and making bacterial conditions congenial there, we are making plant food available, getting heavier sod to plow down, and the corn crop is going to work up the heavy sod and incidentally we have got a ton more of hay to the acre and just as much corn and just about as good a chance for potatoes. If you apply the manure direct for potatoes, particularly horse manure, you are making conditions favorable to scab; that is another reason why I do not like to put the manure on the potato crop.

A Member: How are you going to counteract that?

MR. ANDERSON: Well, if you have clean seed and a five-year rotation, you should not have to counteract it, it should not bother you. I have not been bothered for years, simply because for seven years in succession, I treated my seed with formalin, got it perfectly clean and kept it clean. Two years ago I had a couple of thousand bushels of potatoes and I didn't have a bushel that showed a sign of scab. Now, if I had bought Maine seed and introduced scab each year I would have had to treat that seed each year to keep it clean.

A Member: Do you think the scab will stay in the ground?

MR. ANDERSON: It will stay in the ground if you plant them in the same ground again, but if you plant them in a piece of ground that has not had potatoes for five or six years, I do not think you will have any scab, but if you are buying Northern seed, treat it with formalin. If I do not know the conditions under which the seed grew, I would risk the expense of treating that seed no matter how nice they looked when I got them, because you do not know what you are introducing in your farm when you buy seed from somebody else; that is why I want to use my own home-grown seed.

A Member: How is the application made, broad-cast or in the row?

MR. ANDERSON: We have used it in the row, but it is not practicable. When you use a ton, apply half of it broad-cast and half in the row. The fellows in Maine that grow potatoes use a ton of fertilizer to the acre and we in Pennsylvania are using about half a ton, and then other fellows using two or three hundred pounds of fertilizer, are growing fifty or sixty bushels of potatoes to the acre. The more fertilizer you use, the more crops you are going to have; it is not practicable to use more than half a ton this year on account of the higher prices, but after this I am going to use considerably more than that because it will pay to do it.

A Member: How much do you put on with the Robbins' Planter?

MR. ANDERSON: I can put on about six to eleven hundred, it depends on the drilling condition of the fertilizer.

A Member: Do you use that when you are planting?

MR. ANDERSON: Yes, sir.

A Member: Do you mix it with the dirt ahead of the planter?

MR. ANDERSON: Yes, sir; that is put in; if not mixed with the dirt, before the potatoes are dropped, it will give you an injurious effect. I do not advise you to use half a ton to the acre and use it all in the row, but we do it because we can get the potatoes planted a little earlier that way and every day you advance the planting of the potatoes will increase the productiveness of the crop.

A Member: What is your five-year rotation?

MR. ANDERSON: Corn, followed by crimson clover, followed by potatoes and soy beans, possibly tomatoes and perhaps ensilage; corn that is followed by wheat and clover and timothy one year, and possibly timothy the second year; if it does not suit me to manure that ground I do not want timothy the second year. I believe that the shorter the rotation, the more practical it is going to be. I think the four-year rotation would be better, but we do not all build as we known. It has suited me better to adopt the five-year rotation and largely we have used it.

MR. FIRST: I wish you would just repeat that rotation.

MR. ANDERSON: Corn, followed by crimson clover as a cover crop; that followed by potatoes, another leguminous crop, I grow quite a few soy beans; most of the people follow corn with potatoes and oats; I quit growing oats and never expect to grow any more because it does not pay me, I can make more money out of potatoes and soy beans than out of oats.

A Member: Do you fertilize your crimson clover?

MR. ANDERSON: Oh, no.

A Member: What do you do with the soy beans?

MR. ANDERSON: We sell them direct.

A Member: What variety of soy beans do you grow?

MR. ANDERSON: A medium early bean. I have tried one or two others, but the one called the medium green, not very green, but the early green seems to be a little better adapted to my conditions than anything else I have tried.

A Member: Don't they shatter?

MR. ANDERSON: Yes, unless you cut them soon enough.

A Member: How many bushels can you grow?

MR. ANDERSON: I have grown as little as seven and as many as twenty-five; that was before I knew they must be cut before the foliage drops. If they are cut with a binder before the foliage drops and allowed to stand in the shock until they are dry enough to thresh, they will shatter practically none at all.

A Member: How do you thresh them?

MR. ANDERSON: Take out all the contents, speed your cylinder as slow as you possibly can and you will crack very few of them if they are not too bone dry; then you thresh them. I had seventy-eight bushels on three acres and a half; I sold practically all the crop at three and a quarter, so that paid me better than oats the way we grow oats in our country.

A Member: Do you sell those to the seed market?

MR. ANDERSON: Yes, they went to New York.

A Member: Do you plant in rows or drills?

MR. ANDERSON: Twenty-one inch rows with a grain drill.

A Member: How many bushels does it take to the acre?

MR. ANDERSON: I use nearly a bushel; most people advocate thirty-five or forty pounds.

A Member: What time do you plant them?

MR. ANDERSON: I would like to plant them from the middle to the 20th or 25th of May. But this year, owing to the late season and bad conditions, our ground is not plowed yet; we will get them planted the first of June or last of May; you can get them planted as early as the middle of April or as late as the middle of May and you will have fair success.

A Member: Have you had any noticeable results following the soy bean crop?

MR. ANDERSON: The results have got to be very decided or you won't notice them, and I have not had enough better results following the soy bean crop to notice them; I believe they are somewhat better but don't know how much; they are enough better to be noticed.

A Member: I asked that question because of the results I have gotten from raising the soy bean and following the soy bean with wheat, and where I had the soy bean, the wheat is much nicer than where I had oats.

MR. ANDERSON: Yes, wheat does do better after soy beans than after oats. It stands to reason that a leguminous crop is bound to make the soil better.

A Member: Did you inoculate?

MR. ANDERSON: Why, I have inoculated for a whole lot of legumes and spent more money in inoculation than I ever derived. It is good in theory, but in actual practice you will find that a second planting will always find bacteria there.

A Member: You have been using soy beans for so long that you are not inoculating?

MR. ANDERSON: Yes, but then I had good results from the start without inoculation.

A Member: As good as you have to-day?

MR. ANDERSON: Yes, sir, I grew as good crops the first two or three years as I ever grew.

A Member: Well, I saw patches of scab pretty near as large as the end of my little finger on your soy beans.

MR. ANDERSON: Yes, I had the bacteria all right, I don't know how I got it, but it is there. This soy bean crop and crimson clover crop are essential to the success of potatoes. I don't know much about the cowpea, the soy bean suits my condition so much better that I use it. The cowpea is adapted to the South, the Canadian field pea to the North and I believe the soy bean is the best of the three for us.

A Member: Do you raise the soy bean for the purpose of benefiting the soil or for producing the money you make out of the bean itself?

MR. ANDERSON: Primarily for the money and indirectly for the improvement of the soil. I am sure a crop of oats will decrease the fertility of the soil; if you can put a crop of soy beans there and increase its fertility, you are that much better off, and I get more for the soy beans than I would from the oats.

A Member: What do you do with the soy bean straw?

MR. ANDERSON: If it is stacked soon enough and put where sheep can get at it, it works very well, but if it stacked too late, it is not of much use except to apply as mulch. We set the thresher outside the barn-yard and stack it in the barnyard and allow the cattle to run around it, and in that way we work it up pretty well; they get some food value out of it, perhaps not a whole lot.

A Member: Do you stack it in the barn?

MR. ANDERSON: I think I'd rather have them thresh it right away just as soon as it is fit.

A Member: We stack it in the barn and wait till the thresher comes around.

MR. ANDERSON: Well, you had the soy beans good and dry before you put them in: perhaps they cracked quite a good deal in threshing, did they not?

A Member: Yes, sir.

MR. ANDERSON: Well, that was due to their being dry. I like to have them threshed before they get too dry. Of course the cracked ones can be used for feed and we find that they analyze about three times as high in protein as wheat bran and quite as high as corn does, so they are worth something to you.

A Member: Have you spring corn sludgings for hay?

MR. ANDERSON: No, it pays me better for seed. I don't try many experiments that I do not think will pay me in dollars and cents.

A Member: We have to raise it more for hay than for seed.

MR. ANDERSON: Well, of course, conditions are what you have to be governed by.

A Member: You don't feed any cows, do you?

MR. ANDERSON: We feed ten cattle.

A Member: Do you use level culture for those potatoes?

MR. ANDERSON: Just as level as we can. In working potatoes you have got to throw some soil on the potato each time it is worked. I want that first working very deep; in that we throw quite a good deal of soil on it; then we take the smoothing harrow and go across the row. This year's crop of potatoes got that deep working two weeks ago. Then, after the first rain, we went across the row with a smoothing harrow. That is as far as we got till the present time, until the potatoes are large enough to cultivate we use the header.

A Member: Are your potatoes up yet?

MR. ANDERSON: They are not up enough to cultivate. As soon as they are large enough to cultivate, I want to cultivate them and fairly deep and then work right across with a header. After that the cultivation will be very shallow, getting shallow each time. We want to have as much of the seed bed available for plant growth as possible. The primary object of cultivation is to maintain a dust mulch over the surface and hold the moisture for the potato crop. Potatoes demand a whole lot of moisture if you are going to have a good crop, so it is essential to follow every rain by some sort of cultivation. It should be very deep the first time, fairly deep the second time and after that it gets shallower each time, stirring up the surface and that is all that is necessary to maintain a dust mulch, and that is the primary object of cultivation, to maintain a dust mulch and hold the moisture there for the growing plant.

A Member: Do you make that trench as deep as a plow?

MR. ANDERSON: Just as deep as we can with the shovel plow. We are bound to get into trouble in the way of tearing up corn stalks, for we use the disk ahead of the plow, but I find that we do not really tear up much with the shovel plow.

A Member: Does not clover winter-kill?

MR. ANDERSON: Yes, sir, but generally winter-kills in March and all through the winter it has been holding plant food available for the coming crop, it has been holding the soil for leeching; incidentally while it grew all fall it has been assimilating nitrogen from the earth, it has been increasing the fertility of the soil, and even if it does winter-kill, it has paid us very well. I do not care if crimson clover winter-kills with me every year, I would continue to produce the seed or buy them and apply it, because I know it pays me before its' winter-killed and pays me pretty well. I have seen results for too great a number of years that have been derived from the use of crimson clover and I am firmly convinced that it paid us and will pay every one who can grow it.

A Member: How do you store your seed?

MR. ANDERSON: Put them in the coolest cellar we can. That is about the best we can do. They should go in cold storage, but we get along without that. They should be stored in as cool a place as we can because there are so many diseases; that is another reason why we want to have our storage place as cool as we can get it.

A Member: Do you ever bury them?

MR. ANDERSON: No; it is practical to bury them if you bury them in a long, narrow kit.

A Member: Do you store those potatoes or keep them over?

MR. ANDERSON: If I can get what I consider a good price, they go right out of the field into a car; if prices are very low, as they were last fall, I store them. I didn't know what to do last fall; we sold some at thirty cents but quit that pretty soon; then they got to sixty cents and we sold some more, and I kept some till this spring and sold them for a dollar. If I can get a good fair price out of the field, I sell them right away.

A Member: And let the other fellow take the risk?

MR. ANDERSON: Yes, sir.

A Member: What do you call a fair price?

MR. ANDERSON: If I can get forty or fifty cents out of the field, I think I am making good money.

A Member: And you have more bushels out of the field?

MR. ANDERSON: Yes, you have more bushels out of the field, you get more little potatoes out and avoid the shrinkage, of course.

A Member: What do you call a profitable yield?

MR. ANDERSON: Well I think I ought to get a hundred dollars an acre out of a potato crop; we count on two hundred to two hundred and fifty if it is anything like a good season; sometimes we do not get it and sometimes we get more.

A Member: How do you harvest your soy beans?

MR. ANDERSON: With a grain binder, tie them up the same as wheat. We drive the binder in such a way that we only cut those two inches above the ground.

A Member: Are you bothered with the potato bug?

MR. ANDERSON: Yes, we have a good deal of trouble with the potato bug. There are several insects that are bother enough and I think the potato bug has caused more direct loss than anything we have, and the only way to take care of them is with some form of arsenic. Paris green is the most common. I think arsenate of lead is the best.

A Member: Do you put it in a dust or in water?

MR. ANDERSON: In water, sometimes Paris green is in a dust.

A Member: Do you use a spray?

MR. ANDERSON: Yes, sir, we use it in connection with the Bordeaux mixture. If I spray for bugs, I apply Bordeaux mixture with fungicide as well. We have not been troubled very much with early or late blight in that part of the country. If you are troubled with blight, those in the northern part of the State must spray of course, and the most practical spray to use is the Bordeaux mixture, possibly a four four fifty the first time or two and a five five or six fifty after the second spraying. That spraying should start when the plants are six inches high and be repeated after rains in periods of ten or fifteen days during the growing period. Spraying for blight is distinctly a preventive measure; you cannot stop it after you have it, you simply must spray before you have the blight and keep it out of the way; in that way you can get very good results, but once you have blight, there is no use spraying to control it because you cannot control it. You can prevent it by spraying, but you cannot control it in any way that I know of.

A Member: What has been your experience with the flea beetle?

MR. ANDERSON: The Bordeaux mixture has a tendency to drive him off into a neighbor's field.

The CHAIRMAN: It is a waste of time.

MR. ANDERSON: Well, perhaps it is. I like to spray for two or three objects, if it does not pay for one, it does for another; that is the only thing that will give us any benefit with the flea beetle, Bordeaux mixture; they do not seem to like it; some of them come back, but not all.

A Member: They are where you cannot reach them.

MR. ANDERSON: Yes; the flea beetle itself does not do so much damage, but it injures the plant and puts it in a condition subject to fungus troubles; that is where the flea beetle does its greatest damage. I do not think the flea beetle ever materially decreased the crop directly, but it has decreased the crop a great deal. I did not tell you how much arsenate we use; we find it necessary to use about twice as much arsenate of lead as Paris green. A pound of Paris green is sufficient and two and a half pounds of arsenate of lead is sufficient in fifty gallons of solution.

A Member: You have reference to the paste?

MR. ANDERSON: Yes, sir; if I were using the powdered arsenate of lead, I would apply it in the same proportion as Paris green. I can save time by using the arsenate of zinc; it is just as practical and it is cheaper.

A Member: At the present prices, it is cheaper?

MR. ANDERSON: It has been in the past. The other arsenates are a little bit higher but not anything like as much; if it's that much higher I wouldn't use them. In mixing that Bordeaux, you

want to dilute your bluestone solution and you want to dilute your lime solution before you put the two together. If you do not do that, you will find that it won't stay in solution very well, and more than that, it will coagulate or clot and will stop up your strainers and stop up your nozzles and you will have all sorts of trouble. By putting half of your fifty gallons of water with your bluestone solution before mixing, then putting the two solutions in a common vessel in a dilute form, you won't have any troubles from that cause.

A Member: You say to mix a pound of arsenate of lead with one pound of Paris green?

MR. ANDERSON: Yes, two pounds of arsenate of lead paste will take the place of one pound of Paris green. Most people are in the habit of using Paris green. Two pounds of arsenate of lead paste to fifty gallons of water or one pound of Paris green or one pound of dry arsenate powder. You can get arsenate of lead in either form. Arsenate is as strong as Paris green, and should be used in the same amounts.

A Member: Does the arsenate of lead act quick enough to use?
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MR. ANDERSON: It does not act quite as quickly as Paris green but it sticks better to the foliage and is not quite as injurious to the foliage as Paris green. You want to use more lime than you do your arsenate so as to take up the three arsenates in the solution; if you don't, you are going to have burnt foliage; that is the object, of course, of the lime in the Bordeaux, the arsenate is the active agent. Are there any other questions about the spraying?

A Member: How do you find the powdered arsenate of lead compared with the paste for standing up in the solution?

MR. ANDERSON: Well, now, I have only used the powdered arsenate of lead this year; I used one can in spraying the orchard and I had very good results with it; it is less trouble to put in the mixture.

A Member: It stands up in the solution better than the paste?

MR. ANDERSON: I should think it would quite as well; I don't know whether it does better or not.

A Member: I think it stands in the solution better.

MR. ANDERSON: I am glad it does because it is a little cheaper than the paste form and more convenient to use. If it will stand in solution better, it will be better to use. I did not disk all the ground this year, but I did disk a good deal of it. I am sure it is practical to work the sod up; if you don't, you turn over a mass of matter there which will stop the rise of the moisture from the subsoil where it is of no use to the growing plant. If you work that up and incorporate it with the surface soil before turning it over, you get a

good connection between your soil and subsoil and have conditions favorable to the rise of moisture to where your plant roots are. I don't know just where we are in this potato proposition. Perhaps we have killed enough time anyhow.

I want to repeat in, conclusion, a few of what I consider the essentials in successful potato growing. I want to say that we can do the farmers of Pennsylvania a whole lot of good in going out to the farmers' institutes and impress upon them as forcibly as we possibly can the necessity of plenty of vegetable matter in the soil; and then we want to impress upon them the necessity of hill selection of seed potato.

Another thing that I think is very essential is that first deep cultivation; I think it pays us as well as any other feature; and another thing which I think is absolutely essential is cultivation after rains during the growing period to conserve the moisture during the growing period. We have a farmer down in our country who is President of the Board of Directors of our Fair Association and a pretty good farmer; that fellow can beat me growing corn almost every year and I can beat him growing potatoes every year. It does not follow that his soil is any better adapted to growing corn than mine or that mine is better adapted to growing potatoes than his, but I tell you where the secret of the proposition is: That fellow thinks that corn pays him better than any crop he grows and I have been under the impression that potatoes pay me better than any other, and just as soon as my soil is in condition to cultivate, I cultivate potatoes first, and as soon as his soil is in condition to cultivate, he cultivates corn first, so he beats me growing corn and I beat him growing potatoes.

A Member: Do you recommend planting many potatoes this year?

MR. ANDERSON: You never can tell what the conditions will be. The only way to go into any proposition is to go into it in a normal way and stay by it, and if it does not pay you one year, go right back and find your money where you lost it before.

A Member: I always find that when a crop is high one year, the next year it is cheap.

MR. ANDERSON: That is true, and yet a whole lot of people are basing their planting on that very fact.

The CHAIRMAN: Now we want to dismiss in ten minutes; in five minutes more we will leave this room and the automobiles will be outside. I want to call on Henry Crumley, who will occupy ten minutes of your time and then we will dismiss.

MR. CRUMLEY: Mr. Chairman, Ladies and Fellow Farmers: I say fellow farmers because I am a farmer myself. Until about ten weeks ago I lived on and operated a farm at Plymouth, Sheboygan county, Wisconsin, on which I was born. Ten years before I was born, not a single white man lived in that town; it was a perfect

wilderness. Like many of the other farmers in Sheboygan county, my principal income was derived from the milk hauled to the cheese factory to be made into cheese. I am glad of this opportunity to talk to you for a few minutes in order to impress upon your farmers of this State the need of co-operation in disposing of your farm products. I happen to be the President of and organized the Sheboygan County Cheese Producers Federation in Wisconsin, composed of over one thousand farmers, forty-four cheese factories. The output of these forty-four cheese factories is over one million pounds a month during the flush of the season. I am sorry that I have not got time to tell you the whole story, the story of how the farmers of Sheboygan county combined to bust the Cheese Trust in Wisconsin. It is a story of how the farmers can, if they want to, bust a Trust without putting anyone in jail. Because I have only a few minutes, I cannot tell this story to make it plain enough to you, I am afraid, so I will just glance over the facts.

Now the story of this fight on the cheese combination in Wisconsin has been published in many of the farm journals throughout the country and some of the magazines also. I want to call your attention to this fact, that several weeks ago, before I left Wisconsin, Mr. James H. Collins, of the Saturday Evening Post, spent a day with me in order to get material for writing this up, and within the next two weeks you will probably see a write-up about this fight showing how the farmers have benefited themselves by co-operation in—the Country Gentleman, which is published by the Saturday Evening Post Company, I hold in my hand an article taken from LaFollett's Magazine in Wisconsin telling the story of the fight on the Cheese Trust. If there are any farmers interested enough within the next two weeks, just drop me a line, Henry Crumley, Plymouth, Wisconsin, enclosing four cents in stamps, and we will mail to you this booklet telling all about it, which is better than I can tell you now. It may interest you also to know that more cheese is produced in Wisconsin than is produced in all the other states in the Union combined. Sheboygan county, the county I came from, is the banner cheese producing county in Wisconsin and Wisconsin is the banner cheese producing state in the Union.

As I told you before, like most of the other farmers in the county, my principal income was derived from the milk hauled to the cheese factory to be made into cheese. What we farmers get for our cheese is of great importance to us. How has it been going with us? For years we allowed the cheese-maker to whom we paid a certain sum per pound to make our milk into cheese, to sell our cheese for us; we paid him, say, a cent and three-quarters a pound for making and selling. Now he got that cent and three-quarters whether he sold that cheese for a high price or a low price. Of course he guaranteed to get us the market price for our cheese, but the market price was the Board price. You have all heard probably of the Elgin Butter Board. The Plymouth Cheese Board is for cheese what the Elgin Butter Board is for butter, it fixes the price at which the producer must sell his cheese all over that state and beyond that state; in fact it fixes the price on cheese for all Western New York, from there to the Pacific Ocean and from Lake Superior to the Gulf of Mexico. In the spring these cheese producers would have a meeting and make a bargain with

their cheese-maker and he would agree to make their cheese for a cent and three-quarters and get them the market price which was the Board price, but we allowed the cheese dealers to run that Board to suit themselves. Now up to the spring of 1911 there was some competition in buying on that Board, but about that time there was organized and incorporated the Wisconsin Cheese Dealers' Association, and beginning at that time the price was arbitrarily made regardless of supply and demand; that is it was made low during the season of production and during the season of production the cold storages were filled up and in the winter that Board price was run up and the cheese was unloaded, they shipped cheese out by the train-load, and cheese that we, during that year, got 11 to 13 cents for, bringing our milk as low as 80 cents a hundred, which is less than 2 cents a quart, cost the consumer, when it reached him, 25 to 30 cents a pound.

Now it is a fact that in this country, according to the information we get from our Department of Agriculture, that when a consumer buys farm products, \$1. worth of farm products, that the farmer gets only 48 cents of that, or about that; in countries where the farmers co-operate scientifically, like Denmark, Germany, England and Ireland, the farmers get as high as 90 cents, I am told, of every dollar, in some instances. As I told you, we got 11 to 13 cents for our milk, bringing our milk sometimes as low as 80 cents a hundred, and this cheese was shipped out during the winter, when they unloaded what they had in cold storage at a price as high as 18 to 22 cents a pound, and local dealers there cleared up in one year fifteen to fifty thousand dollars apiece. That went on about a year. In the spring of 1912, after they got rid of what they had in storage, they dropped that Board price as low as 15 cents, which it was on Board day, May 21, 1912. On the next Board day, May 28, when there was a demand for cheese at 15 cents which could not be supplied, they dropped that Board price to 12 cents, and it was then that I wrote and I happened to be at that time a State Senator in Wisconsin and also Chairman of the Republican State Central Committee. That has nothing to do with this, only this, that what I said would perhaps be listened to more than if I were just an ordinary farmer, as I actually was, but I wrote an article for the press charging this Wisconsin Cheese Dealers Association—you remember this was a closed Board, the dealers had the say as to who could bid on the cheese—I wrote an article for the press and sent it to 150 newspapers in Wisconsin, charging them with arbitrarily fixing the Board price, with having the special privilege of storing cheese in the cold storage, with paying the cheese maker who acted as our agent a bonus price on the quiet, on the sly. I called the attention of the State Board of Public Affairs, of which the Governor is Chairman, to these conditions, and asked them to investigate the matter. They did so and had a hearing in the Governor's office in July, 1912. I invited myself to attend, because dealers, cheese-packers, members of the Wisconsin Cheese Dealers Association were all there and I was asked to make my charges and the members of this combination were questioned by the different members of the Board of Public Affairs which is composed of prominent men throughout Wisconsin, headed by the Governor, and every

charge that I made they admitted was true. This combination admitted that they had a secret meeting before the Board met to agree upon the price to be paid; they admitted that the output from the different factories was allotted among the different dealers; that they had the special privilege of storing in cold storage—

The CHAIRMAN: Your time is up.

MR. CRUMLEY: I am sorry that my time is up. Just allow me to make this statement: The farmers co-operated, formed a local association and these forty-four local associations formed a county federation. This county federation built its own warehouse and storage, costing \$25,000, and we are now marketing monthly over a million pounds of cheese which goes directly from the farmer to the wholesale grocer at less expense than a quarter of a cent a pound. You talk about efficiency—there is efficiency for you, and we have busted the cheese trust in Wisconsin. (Applause.)

The session then adjourned.

Tuesday, May 3, 7:30 P. M.

Mr. B. F. Killam in the Chair.

The CHAIRMAN: The subject this evening is "Good Roads," a subject you are all familiar with more or less. If you want to start a discussion, say something about roads and everybody will join in. Tonight everybody will not have the privilege of joining in, but the subject will be discussed by the speakers who are listed. The Governor is not here, as I understand, for some reason or other, I don't know why, and the first speaker on the list will be Mr. W. D. Uhler, Chief Engineer of the Pennsylvania State Highway Department. This address will be accompanied by slides.

Mr. Uhler then delivered the following address:

THE PENNSYLVANIA HIGHWAY SYSTEM

By W. D. UHLER, *Chief Engineer, Pennsylvania State Highway Department.*

Mr. Chairman, Ladies and Gentlemen: I appreciate the opportunity of appearing before this Institute and telling you citizens and taxpayers about a few of the many problems confronting the Pennsylvania State Highway Department in its work.

When the State Highway Department was reorganized in 1911, the original plan was to lay out a State Highway System which would connect the county seats in the State by means of the most traveled

and most direct roads. This laudable intention was frustrated, in a measure, by the desire of various communities to have greater mileage in their localities added to this State Highway System; the net result being that the Sproul Act, under which the State Highway System was designated provided for 8,800 miles being taken over by the Commonwealth. This was far too much. Notwithstanding this fact, the Legislature of 1913 added more than 1,400 miles to the system. Had it not been for the firm stand taken by Governor Brumbaugh the 1915 Legislature would have continued to increase this mileage by adding routes to the Sproul System.

This vast mileage falls on the State to maintain and reconstruct. From the viewpoint of highway efficiency the system, as constituted, makes for Pennsylvania's greatest mistake. No other state in the Union has attempted the control of so great a road mileage. Rather, the practice has been to take over those highways which have been reconstructed with a permanent type of road material and to assume no responsibility for their maintenance prior to that time. Far better would it have been for Pennsylvania had a main line system of roadways been adopted directly connecting the county seats and following the main courses of travel east and west and north and south. This would have meant a State Highway System not exceeding 3,300 miles, which would have been feasible and comparatively easy to maintain with the revenues at the disposal of the Commonwealth for highway purposes.

At the present time the Department is working up such a comprehensive plan of main arteries. It is proposed to secure, if possible, the approval of Governor Brumbaugh to this plan, in which event, all permanent improvements in the future will be limited to this main system until it is completed, after which the laterals will be improved from time to time as appropriations become available.

This, however, does not mean that while the main arterial system is being constructed the balance of the road mileage would be neglected. It would still be our aim to maintain the balance of the mileage in good passable condition until such time as it becomes possible to construct the entire system.

In taking over and assuming the responsibility of 10,200 miles comprising the system, only a small percentage of which was improved, the State shouldered a burden too great to be carried in a proper manner. To demonstrate the wisdom of the policy adopted in other states, I would call your attention to the fact that the Pennsylvania State Highway Department during 1915 spent approximately four and one-half million dollars in maintaining the present system of 10,200 miles and, from present indications, will spend during the year 1916 for the same purpose approximately three million dollars, making a total expenditure of seven and one-half million dollars in two years with nothing of any great moment in the way of permanency to show for it.

In this connection it might be well to call your attention to the fact that the Legislature appropriated for the use of our Department \$8,300,000 for the years 1915 and 1916 as follows:—

\$1,500,000 to pay the State's indebtedness to the townships under what is known as the Township Road Law, providing for a cash tax bonus; \$250,000 for the purchase of toll roads; \$500,000 for State-

aid work; \$50,000 for the improvement of the National Pike; \$6,000,000 for the maintenance and construction of State highways; which gives us \$3,000,000 a year for maintenance and construction work. In addition to this, we had the automobile receipts up to June 1, 1915, which gave us an additional \$1,500,000 for maintenance work, or a total of \$4,500,000 for 1915. Due to a proviso in the appropriation bill, reading that this was inclusive of and not in addition to the revenues derived from the receipts from automobile licenses, this money now goes into the general fund and does not come direct to the State Highway Department for its use. This means that this year we will have available only \$3,000,000 for maintenance and construction work, or in other words, one-third less money this year than last, with far greater demands, together with a large increase in cost of material and labor, which cannot help but greatly handicap the work of the Department during the present season. It is hoped that a portion of this added burden may be overcome by the increased efficiency of our working organization. The three million dollars available for this year's work in itself seems large, but when divided by 10,200, which represents the number of miles of road in the State Highway System, it means less than \$300 a mile. This shows plainly that very little new construction work can be undertaken.

I would like to offer for your consideration the advisability of you citizens and taxpayers taking up with your Representatives the question of appropriating to this Department the automobile receipts accruing during the present year, and to urge the enactment of such legislation as to turn the automobile revenues in the future over to the State Highway Department for use in the maintenance of its roads. If this were done, the amount derived from automobile licenses, including the natural increase in the number of licenses issued, would be sufficient to maintain our State Highway System, as now laid out, or as may be constructed, if proper attention is paid to the construction end of the work, so that the State's revenues would be called upon only to provide the means for constructing the system. The Department is in hopes that the coming Legislature can be prevailed upon to make a fixed appropriation of from three to five million dollars a year for the years 1917 and 1918 for construction purposes, which would enable us to start construction and carry the work on until the time the bond issue will be presented to you again for your approval, or disapproval. Never lose sight of the fact that you cannot build good roads without money.

The work done during 1915 was the maintenance of 6,648 miles of earth, flint, gravel and shale roads; resurfacing 525 miles of water-bound macadam roads; oiling 1,084 miles of roads and maintaining 1,355 miles of stone and other improved roads. These figures show conclusively that the method under which we are working is by far the most expensive way to build up a road system. Had it been possible to expend this seven and one-half million dollars in permanent construction, from five to six hundred miles of highways would have been improved during the working seasons of 1915 and 1916, which, added to the 1,880 miles of road already improved, would have furnished a nucleus for the permanent highway system of the State.

You have heard about the much-heralded Maryland highways. Did you ever stop to think that this system, as now constructed, consists of 1,035 miles with a total expenditure of approximately \$17,000,000. Pennsylvania, today, as above stated, has approximately 2,000 miles of improved roads in its system, but it is not connected and, therefore, makes no showing such as the Maryland System, which runs from one end of the State to the other.

I might add that it is the policy of this administration to maintain the present road mileage in Pennsylvania before attempting any new construction work. We have a large mileage of old State-aid roads together with toll roads taken over which require resurfacing in order to save what little is left of the original improvement, so that, as before stated, the work done during the seasons of 1915 and 1916 primarily has been and will be that of maintenance. The general practice in handling the various types of roads is as follows: Earth roads, to provide the shape and contour by the liberal use of log drags; water-bound macadam roads, to resurface and patch where necessary and then to preserve this surface by the use of a bituminous surface treatment; brick, asphalt, concrete, etc., to make such repairs as may be necessary to keep the road in good condition.

After all improved surfaced roads have been repaired, they are taken care of under the patrol system which has been inaugurated in the Department. This provides for the placing of caretakers or patrolmen in charge of sections of highway from three to five miles in length depending upon the character of the road to be maintained. Each patrolman is provided with tools, material and equipment necessary to take care of his section of road properly. This method has been found to be not only more satisfactory but also more economical than any other devised for the maintenance of highways.

There is no doubt but that the problems of the Pennsylvania State Highway Department have been greatly complicated by the character of the roads unloaded, as it were, upon the State. In a number of cases roads which had been neglected for years and, in some instances, abandoned roads were deliberately bequeathed to the State. As an illustration of this, let me cite one section where five routes, leading north from one of the east and west main highways, were laid down within a distance of twenty miles. One route, twenty-four miles in length, is not open to traffic at the present time, as a portion of it runs over what is left of the right of way of an abandoned narrow gauge railroad, the graded roadbed of which, for a greater portion of the distance, is not more than five feet in width. The rest of the location of this State highway follows old lumber trails which it would be necessary to re-locate and grade.

The second route runs along the Susquehanna River. It should be, and undoubtedly was, a very important thoroughfare to the northwest, but when the railroad was built along the river, the right of way of the highway disappeared. To put a road of sufficient width in this location at the present time would require either the construction of a retaining wall along the river, nearly the entire length of the road, or heavy grading to place the highway between the railroad and the mountain side, as high bluffs are encountered along the whole line. In either event, this would mean an expenditure of at least twenty or thirty thousand dollars a mile exclusive of road surfacing.

The third State highway, in the locality to which I refer, is an historic one which virtually has been abandoned by the local authorities for the past generation. The right of way is covered with underbrush and but little remains to indicate that it once was a prosperous and much traveled highway to the frontier.

Of the fourth State highway, running off from this east and west trunk line, only a short distance is safe for traffic. The railroad built through here forced the re-location of this highway. In many places it was thrown up on the side hill to permit the railroad company the use of the original location. At several points the road now is not more than nine or ten feet in width, with almost precipitous slopes.

The fifth of these highways is the only one that can be put in passable condition at a small expense.

These examples simply serve to illustrate one of the many problems confronting the Department. Of these five roads only one would be used in a main system of highways.

The toll road is another problem to be considered. At the time the Sproul Act was passed there were 717 miles of toll roads in Pennsylvania, of which 521 miles were taken into the State Highway System. Since that time 105 miles of these roads have been acquired by the State Highway Department through purchase, leaving 416 miles still on State Highway routes, the major portion of them being in thickly populated and heavily traveled sections of the State. The toll roads, as originally built, were of great benefit in the early development of the State, but today one looks upon them as a relic of the dark ages. They are an anachronism! Nevertheless, this subject is one that must be reckoned with and the expenditure of large sums will be necessary before all the toll roads are acquired finally by the State.

We should not lose sight of the fact that the improvement of our State Highways adjoining these toll roads enhances the value of this form of private property and means a consequent increase in the price which the owners demand when the State gets ready to take them over. Most of the toll roads remaining in Pennsylvania are located in the southeastern corner of the State, forming a network of highways in and about Philadelphia, Lancaster, Lebanon and York.

By far the most important problem in connection with the development of an up-to-date State Highway System is in securing or providing revenues sufficient to permit of the construction of a main arterial system such as I have outlined previously. Whether such funds are to be derived through taxation or by a bond issue is a question to be decided by the public through the Legislature.

Another problem which causes us great concern is that of the maintenance of bridges on State Highway routes. The law provides, or at least so it is interpreted, that all county built bridges on routes are to be maintained by the county authorities, and all bridges built or maintained by and at the expense of townships are to be taken over by the State. This means that in many instances the county authorities neglect the maintenance of the bridges on the routes taken over by the State and the State is powerless to compel them to make the necessary repairs. The traveling public, however, not knowing

the facts, naturally blames the Department for such conditions. In a number of cases the State Highway Department has notified county authorities of the dangerous condition of certain bridges, but has been met either with a refusal to make the repairs or has received no reply whatsoever.

The State Highway Department, of course, has the usual troubles and problems as to the types of road to be built. It is impossible to satisfy everyone, but the invariable rule of the Department is to consider carefully the local needs and conditions, together with the traffic, grade, original cost and maintenance charges, before making any decision as to the type to be selected. It is my personal opinion that the time has come when maintenance should be the principal governing factor, as in the construction of such a system of highways as is planned by this State, maintenance will be the first item to be reckoned with. There is no doubt but that in the past insufficient attention has been given to the selection of the type of pavement suitable for local conditions.

Allowance must and should be made in the selection of the type of pavement for a constant increase and change in the character of the traffic. The type that made France famous for its good roads, water-bound macadam, as originally constructed and maintained, will not meet the present day traffic demands of the motor vehicles.

Since the advent of motor vehicles, still further demands are made by the constantly increasing size and weight of motor trucks now being used, which creates an entirely new condition. There is no question but that either steps will have to be taken in the near future to control this class of traffic, or else additional revenues must be raised to permit of more permanent types of construction, as the roads built in the past, in the majority of cases, are neither of sufficient width to permit the safe operation at high speed of the trucks, as now constructed, with bodies practically the size of freight cars, nor are the foundations sufficient to carry these excessive loads.

The State at the present time derives no revenues from this class of vehicles other than the regular motor license fee of from five to twenty-five dollars a year, depending upon the size of the truck. This is another question that must be settled by the public through their legislative body.

The question of experienced help, including engineers, superintendents, foremen and even laborers, is a problem confronting us at every turn. We have found it impossible to get sufficient skilled assistants for the reason that road work, along modern lines, is in its infancy. It is necessary to educate the forces and one of the chief troubles in holding together the necessary road organization is, that it is impossible, in fact, impracticable, to provide work for them during the full twelve months of the year. This is because the character of the work will not permit of continuous employment and it becomes necessary, usually, to lay off approximately seventy-five per cent. of the force at the close of the working season. This means that the skilled assistants and good laborers look for work of a more permanent character. Again, in certain parts of the State, we have found it impossible to secure any kind of labor and this, of necessity, makes necessary the importation of foreign labor with all of its drawbacks.

In this connection, I would like to ask the co-operation of all the citizens of this State. If you see anything wrong with the work of any of our men, notify the Department, giving us an opportunity to correct the errors before you start criticism. If you will stop to consider that during the height of our working season last year we had approximately 10,000 men on our pay-roll, you can see plainly that with such a large force it stands to reason we are bound to have some weak links, and it takes time to find them. It is your money that is being expended, and we feel that you should at least co-operate with us to the extent of calling our attention to anything that you may notice, as it is one of the policies of the Department to investigate every complaint that is received. The only thing we ask is that if you do make a complaint, give us full details, and I assure you that the subject will be investigated and such action taken as the case may warrant.

In conclusion, aside from the actual building and maintaining of roads, still another and a very vital question is the proper administration of the affairs of the Department. Too often has it been the case in public office in this country that political preferment has been exercised to so great an extent that efficiency has been impaired. In appointing the late Commissioner Cunningham, Governor Brumbaugh gave him to understand fully that he expected a businesslike administration of the State Highway Department, efficiency as the first consideration. Removals, promotions and appointments in both the Engineering and Executive Divisions have been made solely upon merit. The result is that today Pennsylvania has an efficient and an economically-operated State Highway Department.

Mr. Uhler followed his address with a stereoptican talk, as follows:

This slide shows our organization as in effect at the present time, consisting of a Commissioner, First Deputy Commissioner, in charge of Township Highways, Second Deputy, in charge of Maintenance, Chief Engineer and fifteen Assistant Engineers. The State is divided into fifteen districts. Under the engineers we have fifty county superintendents who are supposed to look after the details of the work, and in addition to that we have the engineers and draughtsmen, clerks, etc., to handle the business of the Department. This represents the present system of State Highways, consisting of 10,200 miles of road. As you will notice, in some sections of the State, they are pretty thick. This (map) is a proposed scheme that we are working on now with reference to a main arterial system. This does not necessarily mean that it is the scheme that will be finally put up to the Governor, but it connects all the county seats in the State, takes care of all the main east and west, north and south routes, and will consist of approximately 3,200 miles of road, of which 1,100 or 1,200 miles are now completed, our main idea being that the main arterial system should be first completed and then the others.

I spoke of a number of roads being unloaded on the State. The first type is a narrow gage road and lumber trail; the second is practically taken up by a railroad company; the third is practically closed to traffic; No. 266, running from Jersey Shore up to Slate Run the greater portion is not safe for traffic. That was re-located

by the railroad and in some sections is 100 or 150 feet above the railroad and 5 to 10 feet in width. The next road, No. 353, is in passable condition and can be put in good shape at very slight expense. This slide shows a picture taken on the road from Jersey Shore to Slate Run. That is only 5 feet in width at that point and 150 feet above the railroad; we had a slide there. This shows the method we have of keeping a record in the office of the contracts while the work is under way. This is a sample of the roads in one of our western counties, which we inherited; not much of it left. This is another one of our roads that we inherited. It came into our possession June 1, last year; it is the additional 1,400 miles given us by the session of 1913. This is another one of the roads that came over to us last year; it was an abandoned pike, had been closed to traffic for several years. The counties and township authorities did nothing on it. That is another photograph taken on the same road. It indicates that there couldn't have been any work done on it for a considerable period of time. This is another one of the 1913 roads that came over to us last year. That is another illustration. That is another road, in fairly passable condition. That is another road out in the western part of the State—slides and no work been done on it, they told us, for a period of at least 8 or 9 years.

That is a sample of one of the many bridges which came over with some of these routes; it shows the different pipes and methods of construction. That is another style of construction. There is another one, a little bit better, although that is simply built out of two inch plank. That is another type; it simply illustrates the problem we have ahead of us with reference to the reconstruction of the bridges alone. There is a good example of wasted energy and material; if that had all been put into a bridge, they might have had a fairly decent structure. That is another type. That is not so bad. That is another type of construction. That is still another one. That is still another type. That is simply a little gully left through there and I think I have a picture that shows that reconstruction. That is the same location with a new culvert. That is a picture taken up near Erie on the Mill Creek road. It shows the effect of the flood last year, which cost the Department approximately \$300,000, not only in Erie county but all through the State. There is a picture taken of the Erie flood, showing the conditions right in Erie. That is one of our roads up in the northwestern section of the State; they need ferries there. That is another one of our roads up in the northwestern section of the State. That means a problem to correct the drainage as well as raising the roads when we come to re-build them.

Now this represents the re-location of one of our roads. This lower line represents the old road down in the bottom which floods two or three times a year, and this upper line the re-location along the foot of the mountain. That is one of the roads reconstructed by the Department showing a re-location eliminating two bridges that was flooded at certain seasons of the year. We threw that up on the higher ground as well as doing away with two bridges which you will notice on the left. That is a picture of the same road showing one of the bridges, and shows the re-location coming in at a higher elevation. That is another one of the same roads showing the construction of the standard guard rail, also the rubble gutter as well

as macadam road surface. That is a picture of how not to make repairs, taken last year on one of the local roads. That is a picture taken up in the northeastern section of the State, showing the way a dirt road is worked up by a road machine and left for traffic. We do not advocate that type of work. That is a picture showing a tunnel in the northeastern section of the State, showing conditions last year where they were doing some work on one of the township roads. That represents an earth road being worked up with a road machine; it shows what can be done with an earth road if properly handled. That shows the material being brought into the center of the road. That is the road completed, shaped up and dragged. That is another earth road and shows what can be done if the log drag is used consistently and properly. That is another picture of the earth road fixed with the drag. That is a section of the highway leading into Erie just outside of the city limits; it shows the condition prior to reconstruction. That is one of the roads in the central section of the State prior to reconstruction, showing the narrow road-way. That is the same road re-built, with a water bound macadam construction, however. That is a borough up in the northern tier of counties, Wellsburg, before improvement. It looks as though it badly needed some improvement. That is the work after it was completed—brick street. That is another one of the roads prior to improvement; that is the road after improvement. That is another one of the roads before improvement; that is the same road after improvement. That is one of the little boroughs up in the northern part of the State before improvement; you notice they have the material on the side ready to go ahead with the work; it shows that it is badly needed. That is another one of the outlying sections of a borough before improvement; brick on the ground ready to go ahead. That is a picture taken in one of the little boroughs up in the central section of Pennsylvania; it shows the road blocked off to traffic, impassable. That is a reconstructed highway showing a bridge, of bituminous construction, standard form of bridge, as constructed by the Department together with guard rail protection. That shows a standard watering trough which we place along some of our more important roads, especially where there is considerable horse drawn traffic. That is a view taken on the Lincoln highway, showing the general effect of the highway, the way it winds around the side of the mountain. That is a road up in Blair county before improvement; that is the same road with a concrete base, laid with concrete headers, being completed.

A Member: What was the cost of repairing that road?

MR. UHLER: I think that road cost about \$20,000 a mile; it had very heavy grading on it, exceptionally heavy grading; that is the Buckhorn road.

A Member: Is it possible to arrange that road so that farmers or people can use their horses on it?

MR. UHLER: I am sorry to say that that type of construction should never have been used on the grades that are on that road.

A Member: Is there any method to remedy it?

MR. UHLER: Only to widen out the shoulders and put some additional stones on to make it passable at all seasons of the year. The road surface itself I do not think you can do anything to it to prevent that slipperyness.

A Member: I had about a dozen horses ruined on it and had to quit hauling on it.

MR. UHLER: I would like to say that the policy of our Department is not to build that type of road on grades in excess of four to five per cent.; we will not allow bituminous construction to go on roads with that grade.

A Member: It is one of the best built roads I ever saw.

MR. UHLER: You are absolutely right on that. You can take a 4% to 7% grade with concrete or brick or water bound macadam all right, but with present day traffic it is necessary to use oil to hold the road and you create the same slippery condition as if you built a concrete road. For water-bound macadam construction the average price is \$11,000 to \$13,000 a mile according to the grading. That is the same road material, that is what we term an asphaltic concrete, a mixture of stone and sand and asphalt.

A Member: It is one of the most substantial roads I ever saw; it is just as good today as when it was built, it is not worn a bit; there is no question about its usefulness.

MR. UHLER: Durability, not usefulness.

A Member: That's what I mean.

MR. UHLER: That is a picture of the same road showing the guard rail construction along the side of the mountain. That is a picture before we started construction on what is known as the Easton and Allentown road. We are building there a concrete roadway. The cement interests in the Lehigh Valley donated 40,000 barrels of cement toward this road and the local people donated the stone; the State is furnishing the labor for the grading and the sand and is doing the work. This is the same road, showing the installation of under-drainage prior to putting down our concrete surface. This is a wet place. In handling this work we availed ourselves of the trolley road which paralleled the road from Bethlehem to Easton, and got all our material hauled by trolley for 16 cents a ton irrespective of distance. That shows the material scattered on the sub-grade. The cement is put in the little houses built of canvass, in piles, and the re-inforcement, That shows the work in progress, dumping the concrete; that shows the steel side forms and reinforcement. On that road we are using a light metal reinforcement placed two inches from the top in order to reduce the number of cracks.

A Member: What is that? Expanded metal?

MR. UHLER: Yes. That is another picture showing the joint installed as well as the reinforcement. That shows the striking off; we used two tenplates for striking off and mulching down the surface. That shows the men floating. That shows a man finishing the joint with a split float.

A Member: What is the width of the concrete surface?

MR. UHLER: 16 feet. The length of the road when completed will be approximately 9 miles. That represents a closer view of a man finishing a joint with a split float. That material sticking up in the middle of the road is the expansion material. That shows the edges at the joints. Instead of using a steel-protected joint, we are simply finishing off the joints, that is rounding off the outside edge of the road to prevent chipping. Those joints are about 39 feet, 6 inches. That is a completed section of the road prior to covering with earth; for curing those the expansion joint projected above the surface of the road. That is the road after it has been cured, and we are cleaning off the dirt. That is the completed roadway after the dirt has been cleaned off and the road has been opened up to traffic. We usually keep it closed 14 to 18 days after the concrete is laid before we allow traffic to go on it. That shows the method used in California in curing their concrete roads. Instead of covering them with dirt, they simply have a ponding method, they have an adobe soil there which is impervious and they throw up this little dump and fill it with water. That represents the effect of traction engine traffic on a bituminous road from the cleats on some of the engines.

That shows the character of traffic that roads are called on to carry after they are improved. That shows the effect of automobile traffic, motor traffic on a water-bound macadam road; all the fine materials ripped out. That is another one showing the effect of motor traffic. That is another picture showing the effect of motor traffic on water-bound macadam. That shows sweeping water-bound macadam prior to treatment with oil. That shows machine broom sweeping; that is cleaning up after the machine broom has gone over it and they are cleaning the balance of the material off with a hand broom. That is the old method of applying oil. That is the first oil wagon in the State several years ago; this is a new method of applying oil with a motor pressure distributor. That is the road after the oil is applied before the chips are spread on the road. That is the road being covered with chips to prevent traffic from picking up the oil. That is a treated road, that was under traffic for about 30 days. That is another treated road up in the northwestern section of the State, treated with asphaltic material. At the same time it shows the manner in which we are trying to treat our State highways with white-washing; on our important highways we are aiming to white-wash the telephone poles and all the objects projecting, which is a big help to the travelling public at night; it makes it look as though someone was on the job. That is another treated road with guard rail

and telephone poles white-washed. That is a shale road treated with simply a dust layer up in the northeastern section of the State; we utilize asphaltic oil to lay the dust. That is another treated road. That is another treated road with dust laying oil. Thank you, gentlemen, for your attention. (Applause.)

A Member: Where a county is deprived of the automobile taxes and the cash road tax, a county containing numerous towns where million of dollars are paid out every day to the employees who are suffering for the necessities of life because the farmers cannot get into them, and the farmers are suffering because they cannot get in on the county roads, what is the remedy—where you are building these arteries for boulevards?

MR. UHLER: Well, the only remedy I see is a question of funds. The Department is absolutely helpless. As far as building these main arteries, if we were to undertake that system, we would have to keep those other roads up.

A Member: What are we going to do locally to get into our market towns while you are building those roads? I live on the State line between Pennsylvania and Ohio; Ohio is willing to meet the Pennsylvania people and build half the road, but that cannot be done, and near Sharon, where I live, the roads are utterly impassable. Potatoes were being shipped from Ferndale, from Bird Hill and Kinsman, bought at 30 cents a bushel, and the farmers realized that it was going to be too late, they'd have to cart them out and put them in the fields, while potatoes had a ready sale at a dollar in Sharon; the consumer and producer were both suffering; what is the remedy?

MR. UHLER: To get sufficient means to improve your main roads, we feel that it is going to take considerable time for the State to raise the revenue to build this entire mileage of 10,200 miles; we feel that the local authorities should help out and co-operate, that they should provide means, should meet us half-way in building the roads. To build the 10,200 miles of road is out of the question; that cannot be done for a period of at least 10 or 15 years.

A Member: We feel that we need the local roads more than the main arteries.

MR. UHLER: Well, the main arteries I have in mind is with a view of market roads, to take care of your main locations. The road you have reference to, is that on the State highway?

A Member: From all these points north into Sharon.

MR. UHLER: If it is not a State highway route, by applying you can get State aid.

A Member: All the arteries lead into Sharon from the State line road.

MR. UHLER: If they are not on the State highway route, the county, if they will raise an equivalent amount of money, can get State aid to the extent of 50%. The last Legislature appropriated \$500,000 for highway construction; that can only be expended on the roads which are not on State highway routes.

A Member: Do I understand you to ask the local people to bear one-half the expense of State highways?

MR. UHLER: I think that is the thing to do if you want to get a system at an early date. You are the people benefitted by it. We have several instances where the local people have agreed to pay 50% of the cost of construction on our State highways. We have an application from Cambria county in which they pledge themselves to pay 50% of the cost of construction of 10 miles of road on the State highway. We have another between Pittsburgh and Washington. We are working on a road in Chester and Delaware counties where the local people have pledged themselves for \$70,000, and other schemes whereby the local people will pay half the cost to get the roads at an early date.

A Member: While the State has approximately 10,000 miles, the local people have 90,000 to take care of; it is a wonderful burden on the local people.

MR. UHLER: Yes, it is a larger problem than the average citizen thinks it is. Of course the State has got the more important roads in all the communities. It is altogether a case of legislation and a case of money.

A Member: Whose fault was it that the State inherited so many poor roads?

MR. UHLER: All I can say is that these routes are laid down by legislative enactment. I am not here to blame anybody. The roads are here; as the Governor says, it is not a theory, we have them and have got to do the best we can with them.

The CHAIRMAN: What interested me particularly was the illustrations you show of roads abandoned for all these years, nobody travelled over them, there was virtually no road there, and the question comes in my mind, what have those people done? They have not gone over these roads. I think the State is taking over highways that nobody requires to travel on—that is the way it would look from the illustrations shown.

MR. UHLER: I assure you that we get as many complaints from those roads as any others about their condition.

The CHAIRMAN: But roads 5 feet wide and along the great mountain sides where apparently there is nobody living, abandoned since the lumber was taken out of the country.

MR. UHLER: That is why I stated that in my opinion the State went about it in a wrong way in laying out the present system, they should not have taken over the responsibility of maintaining these roads.

The CHAIRMAN: Some industrious member of the Legislature wanted to show his people that he got roads; that is about it.

A Member: Have you ever, as yet, anywhere in the State, tried this method out thoroughly? Say we used the split log drag as soon as the frost goes out in the spring time and used it frequently during the summer time to keep that road in good shape, free from ruts, etc., and keep it going until freezing; have you ever done that?

MR. UHLER: We have been advocating that and trying to get our men to do it right along. I think that is the only way to handle a dirt road, to keep at it with a log drag.

A Member: I would like to see it demonstrated somewhere in the State.

MR. UHLER: You cannot help getting good results with that method.

A Member: We had a demonstration in our county that was absolutely satisfactory.

MR. UHLER: It cannot help be satisfactory. (Applause).

The CHAIRMAN: We have with us the Hon. Henry A. Barnhart, Member of Congress from Indiana and a member of the Committee on Roads, Washington, D. C., and he will address us tonight on the subject of roads—"National Road Construction," particularly. Hon. Henry A. Barnhart. (Applause).

Mr. Barnhart delivered the following address:

NATIONAL ROAD CONSTRUCTION

By **HON. HENRY A. BARNHART**, *Member of Congress, Committee on Roads.*

Mr. Chairman, Ladies and Gentlemen: Your Chairman introduced me by saying that I would talk on National Road Construction and legislation particularly. I am going to change that word particularly to incidentally. My good friend, Mr. Patton, with whom I had the pleasure to serve in Congress and with whom I lived at the same hotel for several years, has several times invited me to come to

Pennsylvania and deliver a talk, and I am going to introduce myself by saying to you that I have spent most of my years on a farm and in the farming business, although I have been incidentally in some other things in a business way. And I might say further that I never made a public address until I was almost 50 years old, so you will not expect an oration; in fact, the first speech I ever made was at a meeting in my home city. That was a public reception given in honor of a very popular Methodist preacher who had been returned to his charge for the seventh consecutive year, and I had been asked to speak on behalf of the citizens, the public, and I agreed to do so, but when I got into that pulpit for the first time in my life and saw a great audience before me, and all of those hallowed surroundings above me, I think I must have spoken in a very sentimental vein, because when I had finished and took my seat over to the right of the rostrum inside the rail, a good old Methodist neighbor who lived a square and a half from me for many years, arose seven or eight seats back and came walking down the aisle hurriedly and took me by the hand and said, "God bless you, neighbor Barnhart, if you knew more of the Bible and were an out and out Christian and hadn't been a Democrat so long, you'd make a good preacher." (Laughter).

Another thing, some years ago I was accidentally elected to Congress, and when I went to Congress, I went in mid-term, that is to say, I was elected to fill the unexpired term of a deceased member, and the Congressional Directory, as it always does, carried a considerable write-up of my more or less illustrious career. I prepared most of it myself—I will tell you the truth about it—and I set forth that I had grown up on a farm, that I lived on a farm several years after I was married, that I had been engaged in the newspaper business, that incidentally I was a member of the Board of Directors of the State Correctional Institutions and afterward a member of the Board of Trustees of the State Benevolent Institutions. One day Uncle Joe (Cannon) was in the cloak-room talking with one of my colleagues from Indiana and said: "I see this new man from your State has had a remarkably consistent career. He was first a farmer, then settled down in the editorial chair; he didn't like the newspaper business very much, so from there he went to the penitentiary, and then to the insane hospital, and then, in the very nature of consistency, to Congress." (Laughter).

I do not know very much about this new era of road building. You know we have been kept on the job very closely for the last eight or ten months in Washington; I sometimes think too close for your good and ours too, but that is neither here or there. Notwithstanding that, the spirit of better roads, the enthusiasm for better roads and the need for better roads everywhere has finally reached Congress and you have regularly delegated committees to look after the question of good roads. And fortunately or unfortunately, I happen to be a member of that committee and have helped to put two bills through the House providing government aid for roads.

In this connection I am going to introduce my talk, what I have to say on the good roads, by reading you a text that I secured one day in a conversation with a man in the Agricultural Department who gave me some figures, that, to me, were very interesting. He said that it cost, by horse and wagon transportation on the average

road in the United States as now constructed, 23 cents to move a ton of produce or freight a mile; 23 cents a mile, that is the average cost; on the railroads a ton of transportation cost about $7\frac{1}{2}$ mills per mile, and by the Erie Canal, about 3 mills per mile. On this basis, and I want you to remember this, a dollar will send a ton of ordinary freight by horse and wagon on an average road a little more than four miles; by railroad, at carload rates, a dollar will send a ton of freight nearly 133 miles, and by the Erie Canal about 500 miles. Also, if a horse can move a ton of freight on a level road, it will require two horses to move that ton on a 10% up grade, four horses to move it on a 20% up grade and eight horses to move it on a 33% up grade. We all recognize that up grade is resistance, and if our improperly constructed roads contribute the same resistance, and they surely do, which we discover in order to contribute the least cost of highway traffic is beyond any question whatever.

I was particularly impressed with the remarks of the gentleman from western Pennsylvania, who lives out in my part of the country. When he called attention to the fact that potatoes were being sold by the farmer not very far from the market place for 30 cents a bushel but that it cost the people in this market place a dollar a bushel to purchase those products, I never before have had the illustration of the importance of good highways as a contributory benefit to cheapening the high cost of living impressed upon me as those very few words impressed me. We have men, especially politicians, giving us all sorts of nostrums for reducing the so-called high cost of living, and in a measure there is some need along that line, but it is our wastefulness, men, more than anything else, that has to do with the high cost of living. We do the work, we expend the energy, we spend the money necessary to make the appropriations, and then we waste; but we are getting over it more and more, and if some of you men who are about as old as I am, will go back not so very many years and compare the conditions then with the conditions now, you will see what economics and the practical use of the gray matter is doing in the way of providing better things for the farmer. I have often thought, in travelling over the country, what I beheld on those pictures here tonight, that just a little practicality in the matter of making public improvements will not only add greatly to the appearance of the country and to the comfort of traveling, but it will add to the value of adjoining real estate; it must, in the very nature of things be so. And therefore I have been an earnest advocate of the idea of the U. S. Government contributing its share in the up-building of these roads running through rural districts, where the expense thereof by the rural districts alone would be so heavy, it would be almost an impossibility. So we have passed in the House at this session of Congress a bill providing that the Government shall appropriate as a road fund to be placed at the disposal of the Secretary of Agriculture of the United States, \$25,000,000. That is a good deal of money, but a large per cent. of it will come from income taxes and from men, as we believe, living in the large cities who are wearing out your country roads and not paying a dollar to assist in keeping them up. We expect, under the provisions of this bill, that there will be allotted to each State in the Union a lump sum of

\$65,000; the balance of this money will be apportioned to the states in the proportion, first, of the population of that particular state to the whole United States, and then in proportion, as a secondary consideration, to all of the miles of improved roads in that state to all of the roads of the states of the Union. In that way it has been figured out that the Government of the United States will put up what is sometimes known as 50-50; where the state puts up a dollar, the Government will put up a dollar to the extent of the limit of the appropriation, and in that way those who will help themselves will be helped by the Government. This fund, as I said, will be placed in the care and keeping and at the disposal of the Secretary of Agriculture, who will re-distribute it to the road departments of the several states which have been regularly and legally constituted, and on the request of these road commissions and after the specifications have been presented to the Department of Agriculture which show that the work has been done in a skilful manner and in a way that will conduce to the building of a permanent and durable highway.

There is objection to it. Some people say that each and every community ought to stand on its own legs, so to speak, and, in a measure, that is true; but nevertheless, the road question, as I see it, is one wherein, in certain instances, it is very important to have a good road, that the conditions in that particular township or in that county may be such that the raising of the necessary revenues to construct the kind of a road that the general public needs and that the general welfare of business demands, would cost more than the community could possibly afford to spend for the road.

Another thing, is the importance, in these road commissions, of having men at the head of your State commissions who understand their business. In Indiana it is said that we have wasted 10 times as much money in road building as we have ever secured benefits from, and we have done it by all sorts of makeshift cut and cover road building in practically all of the years gone by. We have, in proportion to the area of the state, the largest, the greatest number of improved road miles of any state in this Union, but I am not going to boast to you especially as to how well and how substantially they are improved. We have gravel in Indiana most anywhere; we can dig anywhere along the side of the road and find a good quality of road building gravel, and that has helped very much in the matter of constructing good roads. But we are reaching a point where we must tear up most of these roads that we already have because of improper grading, of improper drainage and of the lack of all of the essentials that go to make a road bed that will endure. Nothing is so important in the building of a road, as I see it, as the construction of the foundation for that road. Once you have the construction, you will always have a good road with just a little top dressing from time to time, and a little care. If you do not have the good foundation, you will never have a good road. That is the experience in our country, and I take it that it is yours.

I am delighted this evening to see some ladies present. I wish you men would have all sent your wives to this meeting for me to talk to this evening. I know you when I look into your faces, and you are just about like I am. I thought of a circumstance this evening when my boys came home from college one time and one of them wore a

little red hat, a senior hat, and the other a green cap with a long vizor, and they had their trousers rolled up about half way to their knees and their sleeves rolled up above their elbows, and they were sitting on my porch and one day I said to them: "It may be all right for you boys to wear this fantastic garb at college, probably the boys there all do, but you are not making yourselves and your father any friends with the fellows who come along here and stop at the porch to talk to your father while wearing that sort of clothes;" and when I went away, the younger one said to his brother, "Dad's all right financially, but he is slow." And that is the trouble about these men when they reach our age, we are all a little slow, we get a good deal fixed in our minds about "whatever is, is right" as we see it, and we don't change very much. I have always been very successful in the talks I have made if I had plenty of women and boys in my audience; that is my strong forte, and I am going to talk a little to you women about your husbands, and I may have to talk to you husbands about your wives.

What I shall say don't have much to do with roads; I never made a speech in my life where I stuck to my text. I have written out skeletons of addresses and have gone to the platform, and when I left the platform I would find that I had scarcely said anything of what I was going to say. I have had a little experience recently in some theoretical farming. I wrote a magazine article and I sold it for \$17.50 on "How to Keep Boys and Girls on the Farm," and I will tell you about what I said in that article. I purchased an estate near my home town of some two hundred odd acres some years ago that had been in the hands of some heirs of a deceased State Senator for about 15 years, and it was not the ideal farm. After spending all of the Congressional salary that I had laid away for several years in building fences and shaping up the buildings and getting the place in condition, I had a fairly respectable looking place, and I sometimes relate that to my friends in Washington when we haven't much else to do in the evening; and my friend Patton has heard that and he wanted me to tell you something about my farm.

I have a color scheme on my farm and I advocated it in this article I published in that magazine that the way to keep the boys and girls on the farm is to make the farm as nearly attractive as city life and as much as you possibly can avoid keeping the boy and girl in the dreary atmosphere of farm life. That was some years ago and applies to a good many farms now. Boys and girls are going to be attracted by the bright glare of the city life and the picture shows and all the things that go with them, and if you want to hold them on the farm, you have got to show them something there besides work, or they are going to keep on getting away as they are doing at the present time; and this thought occurred to me, that I would adopt a color scheme and I would try that out, and I did it. I painted my out buildings, all four of them, yellow, just as yellow as yellow can be, and trimmed them in white. I painted my house white and trimmed it in yellow. I secured some gold and yellow sorrel horses with white faces, as white faces as I could get. Then I bought some Guernsey cattle—I don't have them any more, I have gone into the Durham business—but I bought these yellow and white cattle, and I bought and have raised yellow Jersey hogs; I have yellow Bourbon

turkeys, buff Oppington chickens; I have the yellow Collie dog with a white ring around his neck and great bushy tail; I have a yellow cat, white ducks with yellow feet, and down across the creek in some old forest trees, we have some yellow fox squirrels, who flaunted pictures in the ambient air with their yellow tails, and in the orchard I have some Grimes Golden apples and there are some yellow hammers flitting here and there occasionally and then there are some yellow hammers driving along the road not of the feathered tribe, and they say "Wouldn't that kind of a farm kill you?" But I tell you what it does. I have had that farm for nine years. After I had it ready, I got 27 applications from some of the best men in my county to take that farm. I took a good man out of that list and put him on there and he is with me today; he is making money, he is careful, he has raised four daughters and a son, he has them in the graded school, he is out of debt and without boasting, he is the best friend, except my own family, that I have in the world.

A Member: Are his children yellow? (Laughter).

MR. BARNHART: The children are not yellow, they are white, though, and they match the farm in that respect. (Laughter). It may be that it is all right to paint the house green and the barn red and to have all sorts of colors, but I found it more attractive the other way. It did not cost me a cent, and the fact that my farm has the reputation of being a color-scheme farm would enable me to get more per acre than any of my neighbors who let theirs run along in the old ramshackle way. Some of you won't agree with that, and I may be wrong, but until I discover that I am wrong, I am going to believe that the artistic on the farm, when it does not cost you anything, is going to be the means, along with the telephone and the improved public highway and the automobile, of keeping the boys and girls on the farm where they ought to remain, because, of all of the vocations in life that I have ever encountered, the independent farmer can be the happiest and most contented of all if he will.

I am going to say a word about the young man. I see before me only two in this audience who are not reaching along toward middle life, at least; but I delivered an address to a graduating class of an agricultural college last year and I had before me all young men, and I said to them: "Young fellows, you are just entering upon manhood's estate, and you stand up clear-eyed and clear-minded, and look all the world in the face. It cost a lot of money to bring you up, boys. Some statistician has figured it out that it costs an average of \$2,700 to bring children from babyhood to manhood, to clothe them, doctor them, educate them and make men and women of them;" and I said, "Fellows, that's a lot of money to put into flesh and blood, isn't it? But you cost vastly more than that; you have cost your father many short meals and long hours and hard knocks and self-sacrifices, and already his hair is beginning to streak with gray and your mother, ah, fellows, you will never know of the heart-aches, the self-sacrifices, the pain, the anguish, the sleepless nights that she has given to make a man of you. Doesn't that sober you, young fellows? Don't you begin to realize that some of these days

you are going to be called upon to take your place, to step into your father's shoes and take his place in the affairs of men? He wouldn't like to have you call him old, but just the same, he is not as young as he used to be; and your mother is already beginning to lean on you. Doesn't that sober you, young fellows? You may think that you will not be able to meet the requirements, but once the load is fairly strapped on your strong, young shoulders, you will carry it and scarcely realize that it is there, if you only have the willing mind." And then I said to them, "Boys, it is high time sirs, that you were beginning to pay the freight and the back debts that you owe your father and mother; but you will pay them, won't you, boys? How? By being always and everywhere a man."

And I want to say something to you men. The place to take the true measure of a man is not necessarily on the farm or in the "Amen corner," not in the shops nor in the office and not in the forum nor on the platform, but at his own family fireside. There man lays aside the mask and we may readily see whether he is a hero or a humbug, a king or a coward. I care never a whit what a man's politics or religion may be; I care not if he prays every night and morning until he is red in the face and so loud that he shakes the eternal hills; if his family dreads to hear his footsteps when he comes toward the house and if the stock is shy and fearful in his presence, that man is not on the square. But, if on the other hand, his children and his dog meets him with a yell of delight, when they see him coming and if love's own sunshine illumines the face of his loved one when she hears him, that man is pure gold and his home is a heaven, for the humbug never gets that near the great white throne.

And then another thing, men, I was asked this evening to relate to you the circumstance of tired hands. Billy was riding on a railroad train one time and the train stopped at a station and he said a large fat man got aboard the train and, as there was only one vacant seat and that was the one Billy was partly occupying, the fat man, whom Billy analyzed as a farmer from the milk splotches on his boots, sat down with Bill, in fact, partly on him, not because he meant to be impolite, but because he was built that way and couldn't help sitting on him, and Billy said that immediately after he had taken his seat, he discovered that the man fixed a stare on an imaginary spot in the aisle of the car and looked at that spot by the mile. Billy finally became impatient and touched him on the elbow and said, "What is the matter my friend? Are you in trouble?" "Oh no, I am not in trouble." "No debts?" Bill said: "No, I am out of debt and have four nice boys and we have a mother and that is what I was thinking about. You see in other years we had to work awfully hard to pay the interest on our debts and to get the clothes and provide the books for our boys and try to bring them along and make men out of them, and mother worked hardest of all. The boys and I had time occasionally to go to the blacksmith shop and over to Wasser's store and to the circus, and went to campaign rallies, but mother was always so busy it seemed she never had time to go along."

Here is a picture of some years ago and some of you men will recognize it. The farmer continued: "You see on Monday she washed, on Tuesday she ironed, on Wednesday she mended the clothes for the boys and me, and on Thursday she worked the garden and

looked after the setting hens, etc., and churned, and on Friday she scrubbed the floors, rid up things about the house and on Saturday she baked and commenced preparing for the big Sunday dinner that she was going to spread for the neighbors that were coming in and the boys that were coming to play with our boys. On Sunday morning she got up early and gathered up the soiled clothes for the boys and myself and laid out our clean clothes and put the soiled ones—made ready for the wash and prepared the breakfast, and when that was over and she had cleaned the dishes away, she commenced preparing the dinner and was so busy about that that she barely had time to say “How-d do, make yourselves at home” to the gathering guests and then served dinner to two full sittings of people and get the dishes washed and her hands wiped dry and her gingham apron changed for one of white just in time to say good-bye to the departing guests, and then she went to bed all tired out with a glorious prospect that she was going to arise on the following morning and do the same thing over again, day after day and week after week and year after year, until one morning she didn’t get up and I hurriedly sent for a doctor and he came and after looking her over, said, “My friend you have sent for me too late,” and four days after that we laid her away up yonder against the hillside where you see those pine trees and the snow is more than two feet deep over her now.” And then he looked down on that imaginary spot in the aisle of the car again for a long time, and Bill mustered up the courage to touch him on the elbow and in a husky voice, said “What did she die of, my friend?” And he said, “Just tired hands.”

I don’t know that we do it any more, but I remember the time when we really did forget about mother and I want to impress upon you men, if there are any here who do sometimes forget, to not do so any more. I tell you the mother in the home is the royal diadem of earth’s creation, she is the best asset we have, and every time I have had an opportunity to lecture to young men just graduating out of high schools, I tell them to get married and marry a girl who knows how to do things and can really be a life partner that is worth having.

But we have a lot of other things, we have trials and tribulations, we complain a good deal, we see things that are not right, don’t we? And we borrow a whole lot of trouble. I heard of an art critic once who was coming down through a public park one day twirling his cane, and in passing a gateway he saw an owl mounted on a post, and he said to himself, “The taxidermist that mounted that bird was a blacksmith; its beak droops too low, the eyes are too staring, its breast is too flat, there are too many feathers on his legs, his tail droops too low and his wings are badly poised.” Just then the owl turned his head and flew away, and the critic said, “He flies like a goose.” (Laughter). We sometimes do that; we say all the things about a fellow we can think of and when we can’t think of anything else. We say he is bow-legged or something of that sort for which he is not responsible, and then we give up. I have seen people give up in absolute despair and say, “I can’t.” Oh, that word “can’t” has done more than anything else to prevent progress, it has done more than any other word in the language to hold men back. If I had said as a boy, fifteen miles from market center, when I was

a little chap "I can't," I'd be out there somewhere yet, I presume, and may be I'd be better off, I don't know, but this thing of saying "can't" often suggests the poem once recited in my presence by old General Sherwood, a member of Congress, 81 years old. He was talking about fellows always saying "I can't," and he said he never got away from this poem:

"There was a man named Joseph Cable
Who got a goat just for his stable.
One day the goat desired to dine,
And ate a red shirt right off the line;
Then Cable to the goat did say
'Your time has come, you'll die this day';
And took him to the railroad track
And bound that goat down on his back.
The train then came and the whistle blew,
And the goat well knew his time was due,
But with a mighty shriek of pain,
Coughed up the shirt and flagged the train."

We can cough up the shirt all right ordinarily if we will just do it, and a good many times we could avoid swallowing it if we would have a little foresight.

That is getting a long way from the road question, isn't it? Nevertheless, as I said to you in the beginning, the road question has been so splendidly presented to you, that most of the things I had in mind were said by your superintendent who seems to know a good deal more than I do about the road question, and therefore, ladies and gentlemen, I am greatly honored, I assure you, to have been invited to come and address you and I am going to close by saying to you what I often say, that it is worth while for any man and woman to make money. You can make it when you have good roads, and you ought to make money. There are tremendous demands for money in the world's work of this day; the education of our children, the question of charities and corrections and all is demanding more and more money and it is your duty to make money and to let loose of some of it, because I believe that the man and woman that strives early and late to gather dollars, to grab every one they can see, to hoard it up somewhere that their children may have something to quarrel over, after they have gone, would about as well never have lived. That kind of money making is hardly worth while, and yet the spendthrift has no place in the economy of our country either.

What I particularly meant to say was that while you are making this money, and, I hope, making it for the purpose of benefiting your country by doing it, there is one measure of caution that every man and woman ought to adopt, and that is to see that it is made on the square, because after you have accumulated wealth, after you have surrendered yourselves with home and family and friends, after you have stood in the leadership of men in scholastic, industrial or professional endeavor, after you have achieved distinction in politics or other avenues of public life—after all of these and possibly many more accomplishments, there will come a day when you will be tired of it all and you will lie upon that couch that has fur-

nished you refreshing rest in all of the years gone by, you will be feverish and fretful and toss about and you will be surrounded by friends that have been your mainstay of strength and support always, and you will be attended by the best medical attendance that your abundance of money can employ, and in the midst of it all, when it might be expected that you would continue to look to these earthly agencies for strength and support, you will turn your back upon it all, and you will reach a hand out into space, and your lips will beseechingly implore:

"Other refuge have I none,
Hangs my helpless soul on thee;
Leave, oh, leave me not alone;
Still support and comfort me."

Men and women, let us do our work each day so that if the darkened hours of despair overtake us, we will not forget the strength which comforts us in the desolation of other times. May we ever remember those bright hours that found us strolling through the childhood of our youth among the picturesque hills and beautiful valleys thereof or lying dreaming on the margin of some quiet river when a light glowed within us, as it has within all of us, and we promised our early God to have courage through it all. Spare us from bitterness and the sharp pangs of unguarded moments; lift our eyes from the earth that we may not forget the uses of the stars; let us not judge others too harshly, lest we might condemn ourselves. Give us a few friends who will love us for what we are, and keep ever burning before our vagrant steps the kindly light of hope, and then, though age and infirmity come upon us and we have come not within sight of the castle of our dreams, we can still be thankful for times old and memories that are good and sweet and the evening twilight of life will find us gentle, contented and happy still. I thank you. (Applause).

The CHAIRMAN: This closes our evening session, except the matter of general discussion. It is now half past 9 o'clock. Is there no other business at this meeting? If not, the Chair will entertain a motion to adjourn.

On motion, the session then adjourned.

Wednesday, May 24, 1916, 9.30 A. M.

Hon. Robert W. Lohr in the Chair.

The CHAIRMAN: The first speaker of the morning will be Mr. W. M. Patton, of Mosgrove, Pa., whose subject is, "The Necessity of Lime in Pennsylvania Agriculture."

Mr. Patton then spoke as follows:

THE NECESSITY OF LIME IN PENNSYLVANIA AGRICULTURE

By W. M. PATTON, *Mosgrove, Pa.*

Mr. Chairman, Ladies and Gentlemen: I am pleased to stand before you this morning in my homeliness, feeling indeed and in truth that I am recognized by some of you, because some of you into whose friendship I have found my way with somewhat common-placeness, have said to me when you came to greet me, that undoubtedly I was not the same fellow you once knew. There always come to us along the lines of life's various changes, and at the conclusion of this year's institute work, when I came home, my good wife said to me, "Wont you remove that nasty old beard of yours? you look like a boy again." One morning, in order to harmonize with her kind desire, I did so, unbeknown to the members of the family, and not a child of mine, of whom I have six, had ever seen me going without a moustache; and when I came into the living-room to be confronted by my three boys, the oldest looked into my face and then looked at my farmers' garb and then recognized me and said, "Papa, you look like so and so;" and the other little boy, a couple of years younger, said, "You look like so and so." The following day some good friends came into my home to spend an hour or two with us and I related the incidents and my friend looked at me a little bit and said, "Do you know I think you look like the devil." (Laughter).

Now, if you will accept me in my disguise, and yet it is my natural being, I want to talk with you this morning briefly and somewhat hurriedly, possibly, concerning a subject that is wonderfully dear to me because of the fact that out of judicious use of lime I have made an old farm, not to bloom and blossom like the Garden of Eden, but I have made it come from non-productiveness onto a paying basis. The subject of lime and its necessity in agriculture in Pennsylvania, as I knew it, is misunderstood, in a pretty well defined sense, in even the best agricultural sections in this good old Commonwealth of ours. I do not think there is another state in all the United States that has a greater diversity of soils than we have; I do not think there is another State in our whole conglomerate list that raises a greater variety of crops; I do not think there is a more progressive set of farmers in the universe than Pennsylvania has. Yet I regret to say to you this morning that in a good many localities the farming of Pennsylvania has fallen into disapproval, and a goodly number of people are coming to us extending the helping hand and saying, "What is the matter with you farmers? Why the high cost of these products? Why don't you raise more?" And indeed and in truth, echo answers, "why."

The truth of the matter is we have had at our command these many years, lo these many years, commercial fertilizers in all their various forms, and we have had the lime available because there isn't another Commonwealth in the whole conglomerate section of states that is

so generously supplied with lime as ours, but we have not used it. Only of recent years in various sections of this State have people come to the recognition of the fact that in order to perpetuate the growth of certain crops, and those crops especially beneficial to their best good, have they come, I say, to a recognition of the fact that they must resort to the use of lime.

Now there has been a cause for this. There are groups of counties in this Commonwealth through which I have had occasion to pass during the past season, where Nature has, in a measure, been niggardly in the dispensing of her providences; where lime is not found. But you go westward, and starting with that good old section from which the homely old fellow who stands before you this morning and a number of others almost equal in homeliness, come out, and over there we have lime miscellaneously distributed but easy to access to that extent that we feel like using it we can get it, we can burn it upon our farms, we can get it commercially at a not too extravagant expense and use it if we so desire. Coming still eastward, as we came along over from Pittsburgh on Monday afternoon, as we go down in the Tyrone district until we get into this beautiful Lebanon Valley, where we find the lime projecting a number of feet above the soil and where it is abundantly distributed all over our Commonwealth, I say to you that that misconception has gone out long years ago, when I was a boy, comparatively speaking, because thirty-five years ago I came into possession of the old farm of which I am the owner; there had never been a single bushel of lime used on that farm; true it had passed through hands that had carried it almost from its virginity down to the time I became the possessor, and there may not have been, and yet I think there did exist a cause for a use of lime prior to my possession thereof. That condition obtains in a large measure all over the State in various sections, to-day, many people are deterred from using lime by reason of the fact of its expensiveness. Many people are deterred from its use because of the fact of its unpleasantness. Many people are deterred from its use by reason of a confidence they have, and yet I think we universally, collectively and individually are coming to an acceptance of the truth in a general sense that if we are to maintain the soil fertility, the foundation of all truly successful agriculture, we must grow such crops as can be grown only by the judicious application of lime.

I said to you a moment ago that the expensive side of the proposition was a consideration. Now, that is true; and yet that expensiveness can be obviated, in a measure, if we, as farmers in communities, will band ourselves together harmoniously and work shoulder to shoulder with the purpose of serving our communities' best good and our individual good. We can purchase this commodity for our farms if we be so unfortunate as not to have it upon the farms, at a much cheaper rate than is obtainable when an individual comes to purchase it in an individual sense. I think that we farmers are more slow than any other organized body, and we are not organized any more than any other company of individuals who are working along conjoint lines in the universe. To recognize the power and the force that within us lies if we will work shoulder to shoulder and in harmony one with the other. However, the general trend is when we

want to make a purchase for our farms, we possess ourselves with that aloofness which prompts us to stand aside, and alone, and one individual will send off, in correspondence form, to a vender of these products which he must have and solicit the purchase, and that coming in a small form, naturally the maximum price has to be paid.

I have in mind at the present moment a little concrete incident, and this little incident that I want to give you will better illustrate possibly than I could put it in words of my own, the application on the home farm, of what I mean. Beginning a month earlier in the winter, we had occasion to put into the home some of the necessities relating to the culinary department, those foods which are just as safe on the pantry shelf as they are in the country store. And in order to relieve ourselves of the necessity of hustling off and purchasing any of those things in town in small quantities, I took down that good old family bible with which we are all familiar—there's scarcely a man or a woman in this audience who hasn't some acquaintance with Sears, Roebuck & Company's catalogue—and I took that down to find out what certain food products would cost me freighted from Chicago to my home. I did not want to buy some things in five pound packages—take rice, for example, I wanted a hundred pounds; and take Fels Naptha soap, I wanted a hundred pounds of that; I wanted a hundred pounds of soup beans, sugar, coffee and those things which are absolutely staple upon the farm, I wanted in such quantities as they would last during the winter months, and after I had made a consultation of this directory of information, I went down to the little home merchant who buys my surplus commodities and pays me the top price, and I said to him: "I have in mind the purchase of certain articles of food that we must have, name me a price on them, will you." And his reply to me was, "Will you give me a day's time to figure on that?" "Certainly, I am in no hurry;" and the outcome was that from the little individual who ran the little corner grocery down in my home town, the man who purchases my surplus products from the farm and pays me the top price, gave me those products with his personal guarantee for them, at 65 cents less, charged to me, than I could have gotten them from the Sears-Roebuck Company, Chicago. What applied to that particular individual, what applied to that case, if you please, applies to the lime proposition, and I say to you that you and I do not serve our own best purposes when we sit idly by and permit ourselves to be hedged about, by those conditions that we are forced eventually to go to the vender of these commodities in an individual sense and say to him, "I want 20 tons of lime." Do you know that the little Jew who comes into our community and establishes himself in a little cheap hovel on a side street and commences to vend his cheap clothing, better understands this process of buying than you and I.

A Member: Are you a Granger?

MR. PATTON: No, I am not a Granger; I wish I were.

A Member: You'd better be.

MR. PATTON: I am a living example of being made such in **any** community in which I find myself and have credentials to carry me through, at a moment's notice; but even you Grangers do not put back of your organization that strength, that force, that power, if you please, of which you are possessed, along these lines of purchasing for the farm. I started in to say to you that the little Jew clothing man better understands this than do most of us farmers who have been in the harness so long, lo these many years, till our heads have grown hoary in the tilling of the farm and purchasing those commodities that come to us as a matter of necessity. That little fellow one morning, after having married a beautiful American girl, prepared for her a home, placed her therein and eventually there came to bless that union a little baby, one of those things so necessary in every well regulated home to bring true happiness. Shortly after its coming, he came over one morning from the little store to find out how Rachel, the beloved one, and the baby were getting along, and coming into that simple home, he found her there with that downy little nestling, if you please, cuddled up in her flexed arm, and was singing to it in tones that only a mother can use, "Bye, oh baby, by lo baby," and his ideas of the power of the mother's expression could not restrain him, and stealing forward, stealthily he touched her upon the shoulder and said, in the Jewish tone, "Dot is right, Rachel, you teach him buy low and I teach him sell high; make good business man out of him. (Laughter). Now that buy low is a consideration when you come to this product of the lime for the farm, and I want to say to you that there are misconceptions growing out, as I view it, of the actual value of lime. Those who sell it in certain localities even make for it the claim that it is a **plant** food, which, in itself, from my viewpoint, I think is erroneous. Within itself it is not capable of producing vegetation. There is even a misconception as to the possibilities of lime in its crude form in Mother Earth. Plato, Cato, Socrates, Aristotle, Pliny, all those old fellows of the long ago, who, before the coming upon the scene of Jesus Christ, wrote along agricultural lines, even delved into agricultural literature—some of those olden characters made the positive assertion that the percolation of the waters through the limestone district had the effect that water would disintegrate the lime particles and carry them into the strata below the surface and that capillary attraction would draw them into the roots of the plant. The recent writers on agricultural lime have, in a measure, confirmed this belief, but I think it is generally accepted at this time, and we, this morning, in this beautiful City of Reading find ourselves surrounded by conditions which, in themselves, refute that statement.

Pass out through the Lebanon Valley, if you please, from here to Harrisburg, where you will find the lime content of these hills protruding in some instances above the meadows themselves; get up into Clinton and Lycoming counties where the lime is so bountiful and you will find it extending above Mother Earth to the height of 190 feet; get over into our home section and you will find it hidden seven to nine feet and even a hundred feet under the surface of the earth and we have to put down mines to bring it forth—the best doctrine we can bring to those agricultural labors of ours is the

doctrine from common-sense based upon actual practice and actual experience, and there is no source to which you and I, we jointly, can go as a body than to the soil itself. The good old book of Job, I cannot give you the verse and chapter and that is immaterial anyhow, but the good old book of Job makes a declaration coming from the lips of that wonderful man, this is the statement: "Ask the soil and it shall answer thee;" and you people of the Lehigh Valley and the Reading districts and the surrounding beautiful fertile country, ask your soils through the plow and the crops you apply to your soil, the question, "Will the disintegration of the lime content of these soils be sufficient, when it finds its way into the capillary waters, be sufficient to rise and perpetuate the lime content of our soils for the continuation of the successful growing of leguminous crops?" And it comes back to you with a thundering, No. We must artificially or naturally, of you please, introduce into our soil from time to time an application of lime.

Why is it necessary? I have intimated to you that in my judgment lime is not a fertilizer. I have intimated to you that it is not a plant food in the sense that manures are. I want to say to you, with emphasis, that in my judgment it does perform upon our soils functions which are wonderfully important but not as multitudinous as one would have us believe. So far as my personal experience goes, I have derived from the judicious use of lime in all its various forms upon my home farm advantages which have been worth while. When I have found a piece of soil that has come to that point along the lines of rotation followed by those who preceded me, that soil has become tough, tenacious, close in texture and needs a loosening up, needs putting in that condition, if you please, that the bacterial development within that soil, of which we knew so little a few years ago, and yet, in order that that development can go forward as the bacteria upon which we now depend so largely for the successful development of the legumes can take place in that multitudinous form into which they should develop to reach their best good—into a soil of that kind the introduction of lime is very beneficial, if we have allowed that old field which lays away out there somewhat remotely situated from the farm buildings, to go back, in a sense, to Mother Nature's way, if we have allowed that old field loving Nature to supplant us and take up her course of procedure and when we have failed to grow thereon crops of a successful character, Nature has come to the rescue and established crops of grass, rag weeds or any of the old volunteer crops that will come when we stop—an application of lime to that field will be beneficial.

Those are two of the instances; but in my judgment, fellow farmers and co-workers, those two instances are as pigmies compared with the third, and that third instance is when we make an application of lime to our soils to control soil acidity, to bring our soils to that sweet condition of which, when we are possessed, we can grow the legumes in any of their forms. So much then for the necessity for it. Now the question naturally comes up, how shall we apply it? It is not my purpose to give you a full, cut and dried synopsis that will govern all conditions under which a man may be surrounded. It is my belief, however, that of the many forms in which lime is applied in this State, there are some that are deserving of a certain

measure of condemnation. Now I recognize, because it has been my privilege to discuss this subject almost from one corner of this Commonwealth to the other and here and there I meet with an individual who locally may not agree with me; but in the main, ordinarily, we arrive at a harmonious conclusion. I believe, my good friends, that there are certain localities in this Commonwealth where farmers who are thoroughly straightforward and interested in the best good of their farms and practicing those practices in the use of lime that are somewhat injudicious.

I will mention briefly some of those practices. Coming down to Reading, between here and Harrisburg, I observed an oat field to which an application had been made. I cannot tell you how extravagantly, but I apprehend from the appearances so far as I could observe them, that it had been rather free. I presume at least seventy-five to eighty bushels of burnt lime to the acre, and that lime had been drawn out—that ground had been broken and that lime had been drawn out and placed in small piles, I don't know how large, but too large, I am going to tell you that, too large; that lime had been drawn out and placed in small piles and after the ground had been broken, an application of it was made by broad-casting it with a shovel of some sort and the mixture was made as nearly as possible by the tillage tools. I do not care what those tools may be of which you are possessed, the disc harrow, smoothing harrow, cut-a-way, double cutaway, or any other combination you can place upon it, if lime be applied to the average Pennsylvania soil in those small clusters of piles and permitted to remain there and you endeavor to distribute it with a long or a short handled shovel, you are going to get a surplus in one place and an insufficiency in others. You cannot mix it properly in that way. I am convinced of the accuracy of the statement I have made by reason of the fact that we could see with all completeness as we came along on the train a well defined line of demarcation where those piles had lain, indicating the surplus. Nor is that the only cause; the professional man appears upon the scene and makes a declaration that lime that is so treated, lime which is hauled out and put in small piles and permitted to lie there for any considerable length of time, loses by leeching at that especial point on which it is placed, approximately 40 per cent. of its correctiveness power within the soil. That is irregular.

There are certain other localities in this Commonwealth, where, by reason of their remoteness, etc., they have to get lime into and upon their farms; they are forced during the winter months to haul it and use it in much the same sense this was used. Aside from that it is applied to the soil during the winter months and then the plow is started in springtime, and as they plow up to this soldier-like row of piles, it is distributed through the broken soil. In other instances, it is hauled and applied immediately to that soil and that soil is broken for corn and the lime is turned in, turned under I want to say, because the average Pennsylvania farmer with the breaking plow that is used in this Commonwealth, generally has too much of a tendency to upset his furrow and turn the organic matter as well as the lime to the bottom of the furrow, and that is where you do not want it. The consequence is that his rotation is such that that soil is first seeded to corn and then broken for oats, and his purpose

and intent is and his idea was to bring back that application of lime in the soil that he had broken for oats and have that soil, that furrow slice sweetened so that the following crop, which will be wheat, he will have the acidity corrected and assure himself of a perfect stand of clover. That is all right and proper; it is a time saver possibly, a money saver possibly, and it is helpful when a man can do that work, when time is not valuable to him, as he can do it in the winter months, but it is an impossibility generally for a man to break that soil for corn and bring it back, because nine-tenths of the farmers do not plow as deeply for oats as for corn and that little flake of lime applied to the furrow slice is left down in subsoil where you don't want it.

Those of you in the various sections of this State, because we differ very materially, we of the west and the locality from which I come, seed down almost invariably with our wheat; you people down here, as I understand it, seed down very largely with your oats; up in the northern tier of counties, they seed down largely with their oats and we seed down with our wheat in the springtime and are prompted to make an application of our lime to our soils, so that the correcting of the soil acidity shall have gone forward, that we will have the soil made in such form that when we have reached the springtime, the month or two which preceded us, when we come to the application of our clover seed, we know there is such a condition existing there that if we make a judicious application of our clover seed, we are almost assured of a stand. On the other hand the people who are forced to make an application of lime to the oats are harassed by reason of such conditions as existed this spring. I have talked to some of your good members since I came here who told me that they had just got their oats in last week. You had embarrassment getting those oats in without the application of the lime, which requires sometime, and we are hedged about by conditions in which you are handicapped for time with this method.

Now as to the time—in my estimation, the good book you know says to us, there is a time for everything under the sun, and so far as I have seen, where it is permissible, where it can be practiced with judiciousness, where we can have that condition that we can go forward along this line of agriculture without entanglement and embarrassment and break the soil and prepare your lime, I care not what may be the quality or quantity you see fit to use, that is up to you, I am not here to extol any particular variety of lime, break that soil until you can smooth it down in such form that you can make a judicious application of your lime, then try the seed and seed the clover thereafter when that sweetening process has taken place and there will not be much likelihood of a failure in the clover stand which we speak of so much.

Incidentally, I should like to mention and to clear up, in a measure, some of the fallacies as regards the different limes. In my home neighborhood there is a lime manufactory—I don't know that that is the right word, if not, I will explain myself with a little more completeness, and you can use your own expression concerning it—they quarry their lime, burn it, grind it, and if that is a lime fac-

tory, you have it—they quarry that lime, which is of a splendid carbonate percentage, and burn it and sell it in that form at \$3 a ton, and then they grind it, and sell it at \$6.75 a ton. The superintendent of that plant was in my home the other day; he paid me a little visit and in a private conversation, he told me confidentially, and I give it to you in confidence, because I want to let you into my confidence pertaining to this, he said confidentially, "There's lots of people in this Commonwealth who want lime and want it badly, but won't have it only in a certain form, and by reason of the convenience of that form, they pay us \$6.75 for a commodity which we could sell them at \$3 in just as good form; it only costs us 75 cents a ton to crush it, but if they are willing to do that, well and good."

Then there is the hydrated form. I have no fault to find with that hydrated lime; I think that we, as institute workers and farmers in a general sense, you as County Chairmen and all of us conjointly this morning understand the ins and outs of commonplace agriculture to that extent that we appreciate the fact that lime is only the product of the limestone rocks found so abundantly in mother earth. One hundred pounds of carbonate represent 66 pounds of that commodity recognized as caustic lime. We take that same 100 pounds of lime and burn it, don't slake it, but we hydrate it which is done by adding to that 56 pounds of lime approximately 118 pounds of water and we now have 175 or 176 pounds of water and lime. We haul that out and use it and pay about \$1.50 to \$2.50 a ton for the hydrating process which you, out on the farm, can do with a few pails of water yourself and save the purchasing and hauling of that water, save that excess cost and serve your own purpose just as well.

Then there is another form of applying it. When the good Lord created these old hills and valleys and mountains and placed within these Pennsylvania soils—I'll give him credit for having done so—that wonderful and marvellous content of ours that is placed there, we never burn a particle of it, he put it there in the raw form and until the hand of man touched these lands, Nature went forward in her processes using it in the raw form. I had occasion, a number of years ago, to be in the extreme western section of this State, and an individual approached me, stating, "I have something I want to show you;" and he showed me a sample of the finest pulverized raw limestone representing 98 per cent. of pure carbon lime, I ever saw in my life; and I became interested and said to him, "What will this cost me." "One dollar a ton at our plant in bulk form." "But I couldn't use it in bulk form, it is so fine that a man has no box in which he could transport it without serious loss; what will this cost me a sack?" "One dollar and sixty-five cents a sack." Sixty-five cents a sack for putting that lime in sacks; well, that is cheaper than you could do it, it is cheaper than I could do it, and I became interested and purchased a carload and hauled it home to the farm and made a judicious application of it to determine whether that lime would perform the function upon my land as the other did, and I have used in excess of 200 tons of that same commodity since and it is giving me perfect satisfaction.

Now, ladies and gentlemen, I should like to carry you further concerning this, but your Chairman has said that you were to quit at 11 o'clock and it is almost half-past ten now, I believe it is now 10:10, and possibly I had better stop right here. I don't want to inflict on you too much. I thank you, my good friends, for your splendid attention. I am glad to have looked into your faces; many of whom I have personal acquaintanceship with and I thank you. (Applause).

MR. FENSTERMACHER: What quantity of lime, raw rock, is required to be effectual?

MR. PATTON: To go into details as regards this matter of lime, we could talk all day concerning it. No man can determine with accuracy. The chemist, it is true, makes the statement that he can take a fragment of soil of a certain plot of ground, provided it is all similar, and make such tests that he can determine just how much carbonate of lime, how much caustic lime it will be necessary to apply to that soil to correct its acidity. No man can determine how much he shall apply. In the olden time we used to apply 75 to 125 bushels broadcast to the acre. I think it is generally accepted in agricultural lines at this day that on the average Pennsylvania soil, on soil that has not reached that abused condition into which no Pennsylvania soil should find its way, that one ton of caustic lime will sweeten that soil to that extent that, with judicious tilage, a leguminous crop can be grown very satisfactorily the following season; one ton of caustic lime.

MR. STOUT: How much raw lime?

MR. PATTON: The scientific man says to use approximately twice as much raw lime as of the caustic lime. I asked half a dozen old fields out on my farm a few years ago, before I began this work, and alongside I put an equal quantity of caustic lime with an equal quantity of raw lime; those fields were in a condition of which I was not ashamed; I had organic matter in abundance; I had humus there, plenty of it, being governed by Job's declaration, I asked those fields, as he demanded we should, and placed twenty hundred pounds of caustic lime to the acre and twenty hundred pounds of raw lime to the acre, of that extreme fineness I mentioned, side by side, and had some of the best judges of agricultural lime in western Pennsylvania, out and say to me which was which, and there wasn't a human eye that could detect; that same quantity of raw lime gave me similar results there side by side. That was on my farm. That would not answer at all times or in an old, depleted field where we want to have quick results.

A Member: Perhaps it didn't need lime at all?

MR. PATTON: Oh, yes, it did; I made the triune trial side by side and they both gave me results where I knew myself to be possessed of soil of that acidity that it would not grow satisfactory legumes. I left one plot as a check plot and placed the twenty hundred pounds of caustic lime and twenty hundred pounds of raw lime

to the acre and have never had a man to come out to make an investigation who could determine for me one iota difference. Not being a scientific man, I could not answer you from a scientific standpoint. The declaration which comes down to us from State College is that the standard measurement requires approximately two times as many pounds of raw pulverized stone as of the caustic product. I have a neighbor who applied 800 pounds of each last season, 800 pounds of caustic lime and 800 pounds of raw lime side by side, and we are awaiting with great interest the outcome of that to see its effect. I thank you. (Applause).

The CHAIRMAN: Do you think it is necessary at this time to call the roll so that the record may show who is present??

The roll was then called and at this and subsequent roll calls, the following members responded to their names:

County.	Name and Address of Chairmen.
Adams,	A. I. Weidner, Arendtsville.
Armstrong,	S. S. Blyholder, Kelly Station.
Beaver,	Walter C. Dunlap, West Bridgewater.
Berks,	H. G. McGowan, Geigers Mills.
Blair,	W. Frank Beck, Altoona.
Bradford,	Louis Piolet, Wysox.
Bucks,	B. F. Wambold, Sellersville.
Cambria,	L. J. Bearer, Hastings.
Carbon,	Edw. Leinhard, Leighton, R. F. D. No. 2.
Center,	John A. Woodward, Howard.
Chester,	Dr. M. E. Conard, Westgrove.
Clarion,	J. H. Wilson, Clarion.
Columbia,	A. O. Creasy, Bloomsburg.
Crawford,	W. F. Throop, Espyville.
Cumberland,	T. J. Ferguson, Mechanicsburg.
Delaware,	Thos. H. Wittkorn, Media.
Franklin,	J. P. Young, Marion.
Fulton,	Frank Ranck, Hancock, Md., R. D.
Greene,	J. W. Stewart, Jefferson.
Jefferson,	Peter B. Cowan, Brookville.
Juniata,	Matthew Rodgers, Mexico.
Lackawanna,	Horace Seamans, Factoryville.
Lancaster,	J. W. Bruckart, Lititz.
Lawrence,	Doris L. Fulkman, New Wilmington.
Lebanon,	Edward Shuey, Annville, R. D.
Lehigh,	P. S. Fenstermacher, Allentown.
Luzerne,	J. E. Hildebrant, Dallas.
Lycoming,	B. F. Kahler, Hughesville.
McKean,	E. A. Studholme, Smethport.
Mercer,	Wm. C. Black, Mercer.
Mifflin,	C. M. Smith, Lewistown.
Monroe,	F. S. Brong, Saylorsburg.
Montgomery,	J. H. Schultz, Norristown.
Montour,	J. Miles Derr, Milton, R. F. D. No. 1.

Northampton,	C. S. Messinger, Tatamy.
Perry,	C. M. Bower, Blain.
Pike,	B. F. Killam, Paupack.
Potter,	A. T. Crittenden, Oswayo.
Schuylkill,	John Shoener, Orwigsburg, R. F. D. No. 1
Snyder,	F. F. Glass, Freeburg.
Somerset,	Robt. W. Lohr, Boswell.
Sullivan,	G. Eugene Bown, Forksville.
Susquehanna,	E. E. Tower, Hallstead.
Tioga,	C. H. DeWitt, Mansfield.
Union,	J. Newton Glover, Vicksburg.
Venango,	Homer C. Crawford, Cooperstown
Washington,	Jas. M. Paxton, Houston.
Wayne,	W. E. Perham, Varden.
Westmoreland,	W. F. Holtzer, Greensburg.
York,	G. F. Barnes, Rossville.

Institute lecturers present:

Anderson, H. M., New Park, Pa.
 Bond, M. S., Danville, Pa.
 Card, Fred. W., Sylvania, Pa.
 Campbell, J. T., Hartstown, Pa.
 Dorsett, E. B., Mansfield, Pa.
 Fassett, F. H., Meshoppen, Pa.
 Funk, Sheldon W., Boyertown, Pa.
 Gillingham, G. I., Moorestown, N. J.
 Gooderham, H. M., Patton, Pa.
 Groupe, J. Stuart, Jersey Shore, Pa.
 Guldin, Paul R., Yellow House, Pa.
 Herman, J. A., Fombell, Pa.
 Herr, John D., Lancaster, Pa.
 Hull, Geo. E., Sharpsville, Pa.
 Lighty, L. W., East Berlin, Pa.
 Lyons, Dr. Hannah McK., Lincoln University, Pa.
 Mairs, Prof. Thos. I., State College, Pa.
 McCallum, M. H., Wernersville, Pa.
 McCurdy, C. C., Hartstown, Pa.
 Menges, Prof. Franklin, York, Pa.
 Patton, Wm. M., Mosgrove, Pa., R. F. D. No. 2.
 Phillips, T. J., Atglen, Pa.
 Phillips, E. L., New Bethlehem, Pa., R. F. D. No. 2.
 Phillipy, Dr. W. T., Carlisle, Pa.
 Rosenberger, Dr. John N., Wycombe, Pa.
 Seeds, Robert S., Birmingham, Pa.
 Stout, W. H., Pinegrove, Pa.
 Struble, Vern T., Athens, Pa.
 Umholtz, R. O., Sacramento, Pa.
 Van Noy, Leon Otice, Troy, Pa., R. F. D. No. 66.
 Watts, D. H., Kerrmoor, Pa.
 Wittman, W. Theo., Allentown, Pa.
 Worthen, E. L., State College, Pa.
 Wrigley, Paul I., Eddington, Pa.

The CHAIRMAN: I am requested to announce a re-convened meeting of the State Board of Agriculture immediately after our noon recess. Our local representative has an announcement to make. Mr. McGowan, please be brief, we have only an hour.

MR. MCGOWAN: The Chamber of Commerce, in connection with the Committee of Arrangements, has arranged a little pleasure trip for the Board, immediately at the close of this session over the various mountains surrounding this beautiful city, together with a noon meal at the summit of the mountain, and I will just read the schedule which I have here in my hand.

(Mr. McGowan then read the schedule).

The CHAIRMAN: We will be required to limit our next speakers to 30 minutes each and do not want to trespass any more on their time. Prof. Franklin Menges, of York, Pa., needs no introduction to this audience. He will speak on the subject of "Crop Rotation."

Prof. Menges spoke as follows:

CROP ROTATION

By PROF. FRANKLIN MENGES, *York, Pa.*

Mr. Chairman, Ladies and Gentlemen: I had a notion to read a speech to you this morning, but I cannot read it in half an hour. Now this question of crop rotation is one that I am undoubtedly interested in and I believe every farmer is. Crop rotation ought to do something for a farmer; it ought to produce the largest amount of human food at the least cost, and at the same time improve his lands. Now, if I would stop right there, probably I would have said all that is necessary to be said, because that is pretty near ideal. isn't it.

MR. BLACK: Then why don't you stop. (Laughter).

PROF. MENGES: Well, I am perfectly willing, Mr. Black, if the rest are, I'll stop. You see you can't embarrass me. (Laughter). You have been at that business before. (Laughter). Now, Mr. Seamans ought to sit beside you and we'd have a combination.

MR. BLACK: Where is he.

PROF. MENGES: Well, all right, I say I am going to leave that statement as my text and don't, for one minute, think I am going to stick to it, because I am not. We have here in this section where we are now, the old four-year rotation of grass and corn and oats or wheat and wheat and back to grass. We have been following that

rotation from the time we started farming in the eastern section of Pennsylvania up to the present time, and I have been endeavoring to change some of those methods and I have run up against the Pennsylvania Dutchman, or two Dutchmen have run up against each other, and I have not been able to get this thing into their heads, that there ought to be some change along these lines. "Why." Why, because in that old rotation we raise well nigh all soil exhaustion crops and not any or very few soil improving crops. A rotation ought to be so arranged that a soil exhaustion crop is followed by a soil improving crop, or that a soil improving crop is grown with every soil exhaustion crop.

Now then that pretty near comes to carrying into effect the statement that I already made and in the old four-years rotation that that thing can be done and we are doing it. In our farm adviser work we are doing just that very thing. I think probably last winter, at the State Board meeting at Harrisburg, I referred to this matter, but it will not hurt to refer to it again. Over here in York county—and I am glad to go back to York county for my illustrations, because that is where I come from, and let me say right here, that we have just as poor farms in York county as you have in any other county, and we are willing to admit it, but we have just as good farms there and as good farmers as they have in any other county, not excluding Lancaster. Nobody is shouting. (Laughter).

A Member: Don't need to.

PROF. MENGES: Well, they don't say anything. (Laughter). In the northern section of that county there is an old farm (and there are a number of them) so poor that the man who owned it could not prevail on a tenant to remain there for more than a year, and sometimes he didn't stay a year, moved off because he couldn't live there. That gentleman came to the Department of Agriculture, and he asked the Secretary whether he couldn't send a man down there to help him out of his difficulties, and he was in difficulty. Now I am not here to blow my own horn; may be I am doing it, but I say I am not here for that purpose—and they sent me down there. What do you think of that? (Laughter). Bad enough, wasn't it? It's a wonder you didn't say that.

A Member: I thought it. (Laughter).

PROF. MENGES: I know you did, that's why I wanted to bring it out of you. Well, all right. There is a farm located on the Mesozoic, red shale and sandstone, hilly, washy, thin, depleted unorganic matter to such a degree that you could hardly find any, and we went over that proposition and I said to my friend, "You have a poor proposition." "Well," he said, "I know that, you didn't need to come up here to tell me that." "Well," I said, "I want you to know that I know it too." I said, "Will you do what I tell you?" He said, "Yes, I will." I said, "Over there is a grass field that I suppose you are going to plant with corn?" He said, "Yes." It looked like it had been a grass field one time, but they had the cows or cattle in there until they had eaten it off down to the roots, and

then they sent the hogs in after the roots. (Laughter): That is no fabrication ;and I said to him, "Plow that field and plow it good and cultivate it." He said he would, and now I said, "I will tell you what I would like you to do; I would like you to make a mixture of fertilizer as I tell you; will you do it?" He said, "Yes, I will." I said, "You make up a mixture of 1,000 pounds of basic slag, 800 pounds of 8 per cent. tankage and 200 pounds of muriate of potash."

A Member: Where do you get your potash?

PROF. MENGES: Well, that was before the Dutch were fighting. (Laughter). And they are not licked, either, Bob Seeds. (Laughter and applause).

MR. SEEDS: I bet you a Panama hat they will be.

PROF. MENGES: Well, I'll get the hat all right. (Laughter).

MR. SEEDS: Get the Irish to do it, if nobody else can do it.

PROF. MENGES: The Irish fight among themselves so much they haven't time to lick anybody else. (Laughter). And I said, "Apply about 250 pounds of that mixture right in the row with the corn." "All right." I said, "That will not hurt." "Why not." "Because the basic slag will neutralize any acidity that may be in the tankage, and the salt or the muriate of potash will not hurt corn anyhow." And he applied that and that started the corn, and then what did he do. Into that corn, at the last cultivation sometime early in July, we sowed a bushel of Whip-poor-will cow peas and covered them by the last cultivation, and do you know that when we came to cut the corn, those cowpeas were that tall and taller and they covered the ground. We went in there with a disk harrow and we disk-harrowed the cowpeas into the ground and mixed them up thoroughly and then sowed wheat there, and with the wheat we sowed that same mixture of fertilizers at the rate of about 250 pounds to the acre. The next spring sometime in the early part of April, we sowed inoculated white blossom sweet clover seed at the rate of four to five quarts to the acre on that old field and harrowed it in, and after we harvested the wheat, we let the sweet clover go on growing until the middle of August, and I am sort of inclined to think it was somewhat after the middle of August. I am not sure about the date, and do you know, my friends, that we had sweet clover there that high. (showing). We plowed down the sweet clover, sowed the ground with wheat, and next summer, after the wheat was harvested, sowed Reginal side clover and timothy in accordance with Mr. Henry Palmer's method down here at Avondale.

Now, what did we do? Why, into that old four-years rotation, which is composed well nigh entirely of soil exhaustion crops, we introduced a soil improving crop with every soil exhaustion crop, and what is the result? The result is that that fellow has no trouble about having a renter on his farm. It cost him a little something to supply the seed, that is true, but at the same time he is improving that land, and let me say again it is just as poor as poor land is in Pennsylvania. Now that is the old-four years rotation. Probably you would like to ask me some questions here.

MR. GLOVER: What do you do in the rotation if you grow oats?

PROF. MENGES: Sow this wheat clover with the oats; we sowed wheat clover two years ago and last year with the oats and we had splendid results; in fact I was up there this spring and you can see along the drills just as far as the sweet clover was sown with the oats, that the wheat is a great deal better. Now that can be done. I am not so sure, Mr. Glover, whether it will work as well with you as with us, because you have a little shorter season. I am not recommending these crops for the whole State of Pennsylvania, because your conditions are not the same as ours are.

MR. BRONG: It's all right as far north as Monroe county.

PROF. MENGES: It works that far north—well, I am glad you talked, Mr. Brong. Let us go along the line a little further. Take the three years rotation in a large number of sections of the states; the three years rotation is followed, grass and corn and Canada field peas and oats and back to grass. That is a splendid rotation; it is hard to beat; it is a rotation, my friends, that I believe will come nearer in the northern section of the State, to doing what I said a rotation ought to do, producing the largest amount of human food and at the same time improving the soil, than any other rotation I know of, providing you introduce some of these soil improving crops.

Now, let us see what can be done along that line. In the northern part of the State, do you know that the winter vetch has become one of the crops that will solve that problem, because rye and winter vetch sown together in the northern part of the State, will produce such results, and I can give instances where this thing has been done, that land invariably will become better the longer it is farmed. Now the trouble is, my friends, with vetch seed, that we cannot buy it because we cannot get it into the United States at such prices that we can afford to pay. And this brings me to a subject that lies pretty close to my heart, because I would like to introduce into the State of Pennsylvania this thing of raising our own seed. We must do it. In this very county in which we are today, take the Hudson River shale which runs along the western foot of the Kittatinny Mountains, beginning over in Northampton county, in Mr. Messinger's county, passing on through Lehigh, Berks, Lebanon, Dauphin, Cumberland and Franklin, are large areas of land so sandy that they get so dry they will not produce any one of our summer cereal crops. Now I am not condemning that land, but there are such sections and I suppose the gentlemen who are here will bear me out in the statement; isn't it true? Well now, what can we do? Do you know what can be done? Do you know that you can raise a crop of crimson clover seed on those soils, cut your crimson clover, plow down the sod, sow cowpeas there, a hot weather, a hot dry weather plant—you won't get a very large crop, but you will get quite a quantity of seed. You can do what? You can produce a crop of crimson clover seed and a crop of cowpea seed all in the same season; and not only that, but you can improve your land as you are doing. I say you can improve your land as you are doing. A crop of crimson clover seed is a paying crop; how is that, Mr. Anderson?

MR. ANDERSON: Usually it is; not always.

A Member: On poor land it is a paying crop, not on rich land.

PROF. MENGES: I know that, that is why I say take these soils; what kind of soils? Early spring farming soils, soils you can farm just as soon as the snow is off of them; you can go in there and plow them and they will never become hard; isn't that right? You can plant potatoes in those soils forever. These fellows down here in the valley don't dare think of it. Now then, what have you? Why, you have started your crimson clover and it will produce a crop by the time your other crops are just about getting well started, and then you can sow your cowpeas and when the hot dry weather comes along, those cowpeas will withstand the adversities of conditions and produce your crop of seed and then what? We can supply our own seed right here in the State of Pennsylvania, and that is exactly the thing we ought to do.

Now, there is another crop that I like to talk about and probably I will get myself into difficulty before I get done; but I have been in difficulty with you fellows before and always got away from you some way or other; and that is sweet clover. I say that crops of sweet clover—I was up here in Huntingdon county not long ago, in the valley of Markleysburg and Entrioken, and right out from the town of Huntingdon those places are situated. We have a soil there that we call the Clinton shale, it is a red shale, and let me say right here that some of the Clinton shale is the best kind of clover land in the State of Pennsylvania, and there are hundreds of acres of that kind of land, not farms, running along that mountain there the name of which I have forgotten, from Huntingdon down to Bedford county, in and through Bedford county, hundreds of acres not farmed at all. A man asked me to come to his place and I went and here he had about 50 acres of that Clinton shale, hadn't raised anything on it. He said, "What can I do with it?" I said, "Raise sweet clover." And he went and plowed it up and this last spring that land has been seeded down for the first time with sweet clover. Now some people say that sweet clover is a weed and not to be endured. Well all right, I will take it for a weed and I like to have it if I can. I say we sowed that land with sweet clover; we are not going to get a crop this year, but next year we are going to have a crop. Now that crop of sweet clover seed—and in the State of Pennsylvania, my friends, the time is coming when the sweet clover will be such a crop that you and I will be absolutely in need of it, because we are going to farm along these lines of raising a soil improving crop with every soil exhausting crop and improving our land more and more the longer we farm it, and what kind of a rotation are we going to follow on that Clinton shale with the sweet clover? We are going to raise several crops of sweet clover seed and then turn down the sweet clover sod, either sow it with cow peas, plant the land with corn and then seed it back to sweet clover and produce sweet clover seed and improve our land as time goes by.

Now my friends, probably here some of you would like to ask me questions and I would be very glad to answer them if I can.

A Member: Can't we grow vetch seed?

PROF. MENGES: Yes, sir, we can grow vetch seed in the northern part of our State; I would not say we can grow it in the southern part in paying quantities, because it is a little too hard. Now the spring vetch is all right; the winter vetch, the kind we want, I don't think we can grow in paying quantities, but there may be men who have had experience along that line, and if you had, I would like you to tell us about it.

A Member: What time of the year do you sow spring clover.

PROF. MENGES: A good time to sow it is in April.

A Member: There is vetch seed up in Bradford county.

PROF. MENGES: I know, you have a splendid soil there, your Catskill shales are splendidly adapted to that kind of crop.

A Member: What is the value of sweet clover as food for stock.

PROF. MENGES: It is just as good as alfalfa.

A Member: Some of them will starve before they will eat it.

PROF. MENGES: Well, now, I want to tell you—what did you say?

A Member: You can get the stock to eat it up there, but it is like sourkraut, they will have to learn to eat it, I guess.

PROF. MENGES: Well, that will do all right. Not all of us have to learn to eat sourkraut. (Laughter). The odor of sourkraut sort of appeals to me, I don't know how it is with you. (Laughter).

A Member: By the merest accident I hit on probably what might be a solution of this vetch seed problem. Two years ago I sowed a mixture recommended by you of winter vetch, rye, cow horn turnips and clover seed in the corn.

PROF. MENGES: You mean crimson clover, don't you?

A Member: Well, I put the medium red in and not the crimson clover. I intended to plow that all down, but there were several acres we didn't plow down next year; then I harvested the rye and found that it contained about 25 per cent. of winter vetch seed. That was in Lycoming county. There is an experience that might help out in the vetch seed problem; that is about the proportion you want to mix it.

PROF. MENGES: Well, I saw that myself last week at Valley Forge on Mr. Tom Royal's farm: we had a magnificent stand of rye there with the vetch all through it.

MR. BLACK: I will say that in Mercer county there has been grown the vetch with rye and it has been harvested as this gentleman says, and there seemed to be a fair proportion of vetch seed with the rye to sow for the next crop.

PROF. MENGES: Well, I am very glad to get that information, that is the kind of information to have.

Now my friends, there is just one more thing I want to refer to, and that is that we ought to raise the crops in our rotation that our soils are best adapted to and that our markets demand; I say we ought to endeavor to raise the crops that our soils are best adapted for and the crops that our markets demand, as near as we can. Now don't you see, my friends, that takes a farmer. Take this valley here, take the Lancaster Valley, take the valley up along the river in Montour, Union, Centre and a few other counties, and then take the limestone valley up here in Huntingdon county and others; do you know, my friends, that those places, those valleys are the places where the milk that goes to our large cities ought to be produced? Now we are not all dairymen, but there is where the milk ought to be produced and the rotation of crops ought to be arranged in such a way that you can produce on your farm what you need to feed to those dairy cows, because when you sell your crops you pay a fellow coming and going, and the result is that you are not getting very much out of it. Now then, I say let us adopt a rotation that will produce these crops that we need to feed the dairy cow. In Bradford and the northern counties are the counties where the butter ought to be produced.

A Member: Where it is produced.

PROF. MENGES: But you are shipping a lot of milk out of there, aren't you, and then there are counties in the northern part of the State where cheese ought to be produced because they have splendid climatic adaptation for just exactly the production of that stuff and it is the best kind of food that you and I could eat.

The CHAIRMAN: Most of you have been reading the National Stockman and Farmer and no doubt have been reading the writings of a gentleman from a neighboring state whom we are fortunate in having with us today. I am glad to introduce to this audience Mr. W. D. Zinn, of Phillippy, West Virginia, who will occupy the next period.

Mr. Zinn delivered the following address:

ALFALFA AND HOW TO GROW IT

By W. D. ZINN, *Phillippy, W. Va.*

I am always glad to get back into Pennsylvania. You have a great State, great because of its natural resources, greater because of its agricultural possibilities, and greatest because of the people, the citizens she has produced, and so I am glad to be here.

I have spent some 20 or 25 years studying alfalfa and experimenting with it, and you ask me to tell what I know about it in 30 minutes. Friends, I don't know much, but I cannot tell it all in 30 minutes, I could not give you my experience in 30 minutes, and so I will just have to touch the high places. I had intended to sandwich in a few stories, one or two that I thought were applicable, but I will have to cut them all out because we want to get down to the real meat in the cocoanut.

I want to call your attention, first, to the five essentials to successful alfalfa production, as I have classified it. First, drainage. Without well drained soil, my friends, you will fail in growing alfalfa; don't try it on a wet soil. This last season I thought my land was well drained and we had a continuous, almost continuous rainfall from the first of January until the first of April, and a lot of my alfalfa heaved up, some of it crawling out 18 inches long on land we thought was right well drained. The second essential is lime, and you had a talk on lime, so it is not necessary for me to elaborate on that, in fact I haven't time, but alfalfa is very hungry for lime. To grow a ton of clover requires about 40 pounds of lime. To grow a ton of alfalfa requires about 60, and if I may say so, alfalfa gets a pretty fair stand the first year and the second year it will turn yellow and die, and when we dig down to the sub-soil, we find the land is too sour to grow clover, the roots have penetrated the sub-soil and for that reason it turns yellow and dies and we lose it the second year. I remember having been invited to try an experiment on a farm over in our country, the owner of which was very wealthy. He took me out and at one end of the field he had a limestone soil, in the other end a sand soil, a soil that had been run very hard, and I said, "Mr. Raymond, let us go to the limestone field out there and grow the alfalfa." "Oh, shaw," he said, "anybody can grow alfalfa there; you claim to be an expert, I want you to grow it here, and I want you to take this 15 acre field and grow alfalfa on it." He said, "I don't care what it costs"—I will not use the term he used—"I don't care what it costs, you grow the alfalfa." I undertook it with fear and trembling, because the land had but very little organic matter in it, and he said, "Tell my manager what to do and he shall do just what you tell him." I said to the manager, "Apply four tons of ground limestone on this soil and turn it down," and he did so, and I said, "Apply four tons more on top of this land and work it into the soil," and he did so. Then I said, "Apply a thousand pounds of 16 per cent. acid phosphate to the acre on this land;" and he did so, and he worked it until the first of August, worked it thoroughly every two days, and he sowed 25 pounds of seed per acre and you just ought to have seen the alfalfa. It cost about \$50 an acre to do that work and seed that ground down to alfalfa, but Mr. Raymond told me the next year, "That field brought me in an income of more than \$100 an acre for the alfalfa." He was a dairyman and was buying alfalfa at \$25 a ton and it cut him more than four tons to the acre. It was lime, largely, lime and phosphorus, that brought it there. Alfalfa is also very hungry for phosphorus.

The third essential is organic matter, and that was what that field did not have, and that is why I feared it so much. If you will follow

the rotation suggested by the speaker who preceded me for a few years, you will get organic matter in the soil and be ready to grow alfalfa, but you are taking chances when you attempt to grow it on land that is low in organic matter.

The fourth essential is freedom from weeds. I have lost more alfalfa, friends, because of the weeds, because of blue grass—and blue grass is a weed in an alfalfa field, of course—because of the grasses and weeds, than from any other one cause, and we have only recently learned how to care for it until we purchased the alfalfa harrow and went over the field in February or the first of March, whenever we could find the ground dry enough, and then after the first cutting, harrowing both ways, and then again after the third cutting; until we did that, we lost alfalfa almost every year from weeds. You want the ground free from weed seeds. Intensive cultivation will do that.

The last essential is inoculation. Some of you are skeptical about inoculation, but you cannot afford to be if you want to grow alfalfa. You may have soils that will grow alfalfa without inoculation. Farmers have said to me, "I sowed alfalfa out in the field and didn't inoculate and I have a fine stand." So you may have, sometimes you do, but you will fail, according to my observation and experience, about four times out of every five if you do not inoculate, and you cannot afford to take that risk. It does not cost much to inoculate, therefore I would say that inoculation is essential. At the Bethany College Farm in West Virginia, where I was carrying on some experiments a few years ago, I sowed one plot of ground without inoculation, and it was good rich soil, possibly not containing as much nitrogen as it should have had; then I sowed one plot with seed inoculation, using the cultures; then I sowed one plot with soil inoculation and then we sowed one plot with both seed and soil inoculation. Where did we get the best alfalfa? Where we inoculated both. What kind did we get where we did not inoculate at all? None. It came up, turned yellow and died. We had a farmer's day during that season and I told the farmers before we left the room what we had done there and I said, "I want you to point out the places we treated in that way," and there was no trouble finding the plots that had not been inoculated; it was a little trouble to find the plot that had only one inoculation. They said "Here is the finest alfalfa, there is where you must have put on a double dose of inoculation;" and it was so; inoculation is essential on most soils. I guess it is true that all seed carries on it more or less bacteria and you put it in the soil with the seeds.

MR. HERR: Is it practical to inoculate our seed by sowing alfalfa seed with clover seed.

MR. ZINN: Yes, sir, that is a practical way to do it: you will get the inoculation a little at a time in that way. If the soil had plenty of organic matter in it and consequently plenty of nitrogen, you could grow alfalfa without inoculation, you could grow it without bacteria at all. The reason we have to inoculate for alfalfa and soy beans and sweet clover—and I have had more trouble to grow sweet clover than alfalfa,—yet I know some farmers who succeed very well with it. If we had this nitrogen in the soil or if you will pile on nitrate of soda every year or two or three times a year, you could

grow it without inoculation but you would not get much benefit from the alfalfa, you would not get the nitrogen out of the air. But if it has nitrogen enough in it to grow alfalfa until the bacteria is developed in the soil, you will grow it without any trouble. Now, having given you the five essentials, I want to speak just a little bit about the methods that I have followed on my own farm and which have been followed by those who grew alfalfa under my supervision.

A Member: What kind of a harrow do you use?

MR. ZINN: A spring tooth alfalfa harrow.

A Member: What difference is there between it and any other spring tooth harrow?

MR. ZINN: The teeth are very close together, turned around like a rod next to the ground and have a diamond-shaped point on the end and can be set with a leader. They tear up absolutely all the ground. I expect some of the farmers here have the alfalfa harrow.

A Member: How would the cut-a-way harrow do for the same purpose.

MR. ZINN: I tried it and almost ruined my alfalfa. I do not think that in our climate we can afford to split the crowns of the roots, I think it causes them to decay and I would much prefer using the spring tooth harrow.

A Member: Would a thin harrow serve the purpose?

MR. ZINN: Not very well, it is mighty hard to get grass out with a thin tooth harrow. I want to take up the different methods, I believe the best method to grow alfalfa is to prepare the ground, beginning to plow now or a little later as I did on Mr. Raymond's farm and cultivate that field until I should say about the last of July, possibly would be late enough, or the first of August we find will do in West Virginia, and then we sow the seed as I indicated we did on Mr. Raymond's farm, using a very heavy application of phosphorus, not always a thousand pounds to the acre, because we are not millionaires down in West Virginia, as Mr. Raymond was, but I believe that it will pay you to use 500 pounds of acid phosphate to the acre whenever you are seeding land to alfalfa.

A Member: How much lime did you put on to the acre?

MR. ZINN: 8 tons; 4 tons on the top of the sod and 4 tons on the plowed ground. I would not recommend that to the average farmer, but Mr. Raymond did not care for the expense.

A Member: How much inoculated soil to the acre?

MR. ZINN: We say 300 pounds when we are writing someone about it, but if you have got an adjoining field, you'd better take the manure-spreader, set it to a spread of three loads to the acre and

cover that field at that rate with the inoculated soil. That may seem extravagant, but I tried that for two years on some of my fields and when we started that spreader; as you all know, we would throw out piles of dirt there more than elsewhere. Each year you could go around in October and see where I started that spreader. I called the attention of my neighbors to it down there and I said, "There's simply more bugs there, that is the reason I do better there;" you can't get too much inoculation, and yet where you are having it shipped, three or four or five hundred pounds will answer the purpose.

A Member: What is your opinion of commercial inoculation with the soil in the hands of the average farmer?

MR. ZINN: I get better results from the soil than the commercial inoculation in my demonstration work. This last year we had a good many farmers to inoculate soy beans. Some of them failed entirely to get results. I am sure if you took the dirt from a field that was thoroughly inoculated and scattered it over and harrowed it in immediately, I am sure you would get good results that way, and so I am recommending that generally.

A Member: How much soil to the acre?

MR. ZINN: From 300 to 500 pounds ordinarily; more will be better if you can apply it.

A Member: How much alfalfa seed do you sow per acre?

MR. ZINN: We have to be mighty careful when we talk that, because we go over in Ohio and find some good authority saying 6 pounds to the acre, and in Ohio farmers are growing good alfalfa, some say 10 pounds, some say 15; I think the Station says 15 pounds. The New Jersey Station I think recommends 30 pounds; the Virginia Station, 30 pounds. I do not remember what your Station does recommend; our Station recommends about 20 pounds. I usually sow about 25 pounds of seed to the acre. Now if you will sit down and figure how much that is to the square inch, you will say, "Oh, there is no use using it," but some of that seed will fall in stony places, some of it will not germinate at all and some will be like some people that I have known, they will be too trifling to amount to anything after they do come up and will have to be crowded out by more vigorous plants; and so I want to cover the ground pretty well. I am criticised for recommending 25 pounds of seed to the acre, but we are doing it.

MR. SEEDS: Won't the percentage of the germination of the seed have a great deal to do with it?

MR. ZINN: Yes, sir, and the purity of the seed, so you cannot lay down any hard and fast rule as to the number of pounds you would apply; I do not believe that I would risk less than 15.

A Member: What is your opinion of the Iowa Station recommending scarified seed?

MR. ZINN: I have not found it necessary for alfalfa.

A Member: Have you made any experiment with it?

MR. ZINN: Some few. Where the seed has a high percentage of germination we have but very little trouble. I think it is necessary to scarify the sweet clover seed and some others we have been growing.

A Member: Where did you get your alfalfa seed?

MR. ZINN: Well, we buy it from various places, generally South Dakota is where I have been getting my seed more recently; I don't know that I get any better seed there than in some other places, but I feel that it is more likely to be raised there than in the east.

A Member: Did you ever buy any from Kansas?

MR. ZINN: No, sir.

A Member: Did you ever sow down alfalfa with oats?

MR. ZINN: I am coming to that. I prefer the beardless barley to the oats; I think you will get better results, for the reason that the oats will cover the ground and seem to have more blades than the beardless barley; if you will cut those oats for hay and beardless barley for hay, you will stand a pretty good show for getting the alfalfa. Last year I sowed rye for hay and that part of the field had produced alfalfa before I cut the rye and I made about three tons of rye hay to the acre and we got an elegant stand of alfalfa in the rye but scarcely any in the wheat, the wheat killed the alfalfa. That brings up a method I have followed of sowing rye in the fall. In West Virginia we are growing a lot of rye hay and we think a great deal of it, because you can get off a crop of clover and timothy or two of alfalfa the same year. We sow about a bushel and a half of rye to the acre, and about the first of April we put the lime on, put the lime on in the spring before we plant the corn, if possible, and then fertilize the rye with about 200 pounds of acid phosphate and about the first of April, whenever the ground is in condition—we did not find it in condition this year and got our rotation disjointed and we have to sow soy beans where we wanted to have alfalfa growing at this time and could not sow it at all, but we sow the alfalfa seed, put it in in the first place with a disk drill, alfalfa and clover seeder, which is a very useful instrument, and then go on with a spike tooth harrow, sometimes harrowing both ways. I told my men to harrow until they think the rye is growing and harrow it across the other way. We cut the rye just as it comes in head and have been able to cut two or three crops of alfalfa the next season. If we leave out the next winter, we are way ahead in the game and I have been recommending that method of seeding the rye. Sometimes you will fail just as you will when you sow the last of July or the first of August, but we have found that method very dependable.

I believe then that the thing for the amateur farmer or alfalfa grower to do is this, mix one-half alfalfa with one half clover. 10 pounds of each, seed the rye, seed whatever you are going to put in, down in that way, and if you get a ton of alfalfa and you will with 10 pounds if it comes well, in two years anyhow the clover will have disappeared and you have your alfalfa. We tried that at the College, the Bethany College farm, two or three years ago and got a very fine stand of alfalfa that lasted for several years after the seeding. You have not lost anything; you have inoculated the soil, and if you fail to get alfalfa the next year, you have it ready to sow alfalfa the next year.

A Member: Do you use medium or red clover?

MR. ZINN: Red clover is what I use all the time. If I am sowing clover in an acid soil, I use the Alsace; if I am sowing with timothy, which I rarely do, I would then recommend the Mammoth clover.

A Member: What proportion of alfalfa and clover do you use?

MR. ZINN: 10 pounds of each; 10 pounds of medium red and 10 pounds of alfalfa.

A Member: Do you sow it in August?

MR. ZINN: Yes, you might sow it in August in the same way. I have never done that; I always sow it in the spring, in wheat and rye, and I have now the finest field I think I have ever had on my farm, and I sowed last April and April a year ago, and that is what I intend to do this season. You possibly might not be able to sow here until the 15th, perhaps, but you ought to get it in pretty early, the weeds will come in May and June; I do not think anything of May and June for sowing alfalfa, the weeds are coming so abundantly that it is apt to clog the alfalfa out. I would be glad to have questions. I have hurried over this, because I was afraid I would be called down before I got through, but I have about covered the subject.

A Member: Do you sow spring rye or winter rye?

MR. ZINN: If I was sowing in the spring, I would certainly sow spring rye. Last year I had a farmer to sow winter rye in February and it did very well; another farmer sowed winter rye because he couldn't get the spring rye, in April, and it simply covered the ground and died about the time the rye should have ripened, and never grew up at all and ruined the alfalfa.

A Member: How about Grim seed?

MR. ZINN: If you can get it, I guess it's all right; it's mighty hard to buy.

A Member: You talk about sowing a bushel and a half of rye; what kind of soil had you when you sowed that?

MR. ZINN: Do you mean how fertile?

A Member: Did you have limestone soil?

MR. ZINN: No, sir, it is a sandstone soil and land that will produce fifty to seventy-five bushels of corn to the acre, pretty well limed. We are using that amount of seed on nearly all our land in my county. We sowed last season more than four thousand acres of rye for hay, and I am sure last week we harvested more than a thousand acres of rye hay in that county; some farmers report that that makes three tons to the acre; I saw quite a number of fields where I am sure they made over two tons, and we are finding it is just about as good feed as timothy; it analyzes, as some of you know, a little better than timothy; timothy analyzes 6.8 per cent. protein, and rye hay 10.8 per cent.; it is probably not quite as digestible.

A Member: Isn't your rye apt to smother out the alfalfa in the Spring?

MR. ZINN: Not a bushel and a half; we cut it as soon as it comes in the stalking to head; the stalking is all over before that time. In very rich land I did notice a garden spot that had been sowed down where the rye was really too thick for the alfalfa and the farmer lost his seed, I think by sowing it.

A Member: If I understand you properly, you spoke about Fall sown rye seeded to alfalfa and disked two ways?

MR. ZINN: Yes, sir, we sow it in the fall and then harrow it; we do not use the disk. We use the disk drill, but only disk it one way and then harrow it afterwards. Sometimes we find it necessary to even harrow it if the ground is very loose and disk drill it, covering it pretty well, we let that suffice; if it is hard, we go over it twice.

A Member: Don't you believe that the application of acid phosphate or some other phosphate fertilizer is important enough to be considered one of the essentials for successful alfalfa production?

MR. ZINN: Yes, sir, I should have added that.

A Member: I understood you to include organic matter?

MR. ZINN: Yes, sir, but I would not sow a square rod of alfalfa without using a pretty heavy application of phosphoric acid of some character.

A Member: I have in my mind a crop that has been out a couple of years; wouldn't it be advisable to put more lime on when you cultivate it after the mowing?

MR. ZINN: Yes, sir, we often go over our alfalfa fields and re-lime them—the permanent alfalfa.

That brings up another point that has not been asked here, that is about thickening up a stand of alfalfa; have you had trouble that way, friends? I guess you have; those that have been growing alfalfa. I am not sure that I have a remedy; I think I have; I visited a farmer sometime ago; he had an elegant stand of alfalfa. I said, "Tell me how you got this." He said: "I sowed it and only got a partial stand; the next year, after the second cutting, I went on to it and sowed nearly as much again and harrowed it in thoroughly. Why did I do it after the second cutting? Well, I just happened to;" I said; "I believe I see the reason; after the first cutting, if you had sown it then, the growth would have come on rapidly, and being a good growing season, it would have been cut off by the machine at the second cutting; when you cut it the second time, vegetation was not growing so rapidly, the alfalfa did not get so high and you did not cut it off; at the third cutting, it had all the Fall and Spring to grow and made a crop the next year." I think there is the trouble, that you will cut it off, if you don't sow it the second time. I am not sure that will work every year, but it did in this instance. Have you any other questions?

A Member: One of the chief difficulties in Lancaster county in growing alfalfa is after they cut the first crop, the second crop coming up will turn yellow on ground that has been in alfalfa five or six years, that has been limed, has good drainage, has been inoculated, but our chief trouble has been the plant turning yellow on fertile soil, we will get the first crop but not the second.

MR. ZINN: Do you know whether that is a kind of a rust or not?

A Member: I don't know what it is, but we don't get the crop.

MR. ZINN: If the soil is thoroughly inoculated, well drained, has plenty of lime in it, the alfalfa should not turn yellow unless that rust peculiar to alfalfa strikes it, then all you can do is to cut it, and I even take the chances of cutting it before it is ready to cut, before the sprouts start, if it gets yellow, because it will never make any more growth, and I remove every particle of that rusted alfalfa from the field.

MR. HERR: It has been the universal complaint in our county.

MR. ZINN: I guess you noticed carefully the leaves, to see whether there are not dark spots on them; if you find those, why the alfalfa has that rust.

A Member: Regular rust has been very common in the State.

MR. ZINN: I cannot see why this alfalfa should turn yellow, unless it is rust.

A Member: I had that same trouble with rust on alfalfa.

MR. ZINN: I think we all have, who have been growing alfalfa.

A Member: I sent a sample to State College and they said it was rust. We cut it regularly and it came on all right the next time.

MR. ZINN: That happens quite frequently; we should not be discouraged if we fail ten or twelve times in growing alfalfa; they did that in Kansas. Send to F. D. Coburn, Manhattan, Kansas, for his little book, costing 20 cents, and you will find a statement to that effect. They grow it there now so they can't rest at night, they have got to harvest it night and day to get it off for the next crop to come on—so the Kansas boomers say. I heard Dr. Lipmann a few years ago, in New Jersey, make this statement, that the character of the soil did not count much in growing alfalfa. I thought to myself when I heard it "you are making a pretty strong statement," but I have gone over Virginia, Kentucky, New Jersey, Ohio and Indiana and have seen it grown on all kinds of soil. Naturally I prefer, because I had more success in growing alfalfa on it, the heavy clay soil, but I have seen it grown on sandy soils and on all characters of soils. I believe that Dr. Lipmann was right ten years ago when he made the statement—I think it was that long ago when he said, "You can grow alfalfa anywhere if you get the conditions right," and those conditions are some of the things I have already named.

The **CHAIRMAN:** Mr. McGowan has an announcement to make.

MR. MCGOWAN: I want to announce a little misunderstanding in reference to the noon meal on the mountain summit. The Shriners happen to be in town at this time and the gentlemen who had in charge the arrangements for this meal have mixed the Board up with the Shriners and have taken all our "eats"; so we will go through with the trip all right just the same, but be back here for the noon meal. I have arranged with the landlord here to expect us back, so we will go right over the mountain without any delay on the mountain summit and be right back here and take our usual meal, which is paid for here anyway. The price of the meal on the summit would have had to be extra, so it will no doubt please some of you. There is a little gratification in it and a little displeasure too; so we are ready for the trip, and while I am on my feet, I want to say that in the afternoon, at four o'clock, we have arranged an ample number of automobiles to take us out to the Fair Grounds, so we will have you on the go as long as you are here.

(The session then adjourned).

Wednesday, May 24, 1916, 1.30 P. M.

Dr. M. E. Conard in the Chair.

The **CHAIRMAN:** The time has come and passed when the meeting was to convene, but the delay has been unavoidable. It was intended that we should hold a short session of the State Board of Agriculture at this time, but none of the vice-presidents are present just now, so we will have to let that go by and proceed. The first number on the program this afternoon is one in which we are going

to take up an entirely different phase of agriculture. We have been talking about the growing of crops and of fertility, etc.; now we have to consider, for a time, the machine or the member on the farm by which we convert those crops into human food, namely, livestock. It is not necessary that I should introduce to you the gentleman who is going to speak first, because I think he is pretty well known to many of us; many of us know him quite well personally or by reputation. I have the honor of presenting to you Prof. Helmer Rabild, of the U. S. Department of Agriculture, Washington, D. C. Prof. Rabild is in charge of Dairy Farming in the United States and he tells me that in the last few years a supervision of the dairies of the United States has increased so rapidly that he began a few years ago with four or five men and now he has sixty men spread over the United States who are exercising supervision over the dairy work in the United States. Prof. Rabild is going to take up Community Breeding, that feature of dairying which is very much neglected in Pennsylvania. I introduce Prof. Rabild.

Prof. Rabild spoke as follows:

COMMUNITY BREEDING

By **HELMER RABILD**, *U. S. Dept. of Agriculture, Washington, D. C.*

I wish to express my pleasure at being permitted to be here with you to-day. I have had the privilege in the past of doing a little institute work in this State, and I was very sorry last winter that the press of other work prevented me from filling an engagement which the State Department of Agriculture tendered me. I am especially pleased to have the opportunity of presenting this subject of community breeding before you men, for I realize that a large share of the advancement of agriculture in this State has been due to your earnest and untiring efforts.

Pennsylvania is one of the oldest and has always been one of the leading dairy states. According to the census of 1910, it is exceeded in total value of dairy farm products only by New York and Wisconsin. The total value of dairy products sold is \$44,852,066. In number of dairy cattle Pennsylvania ranks seventh, with 933,640 dairy cows on farms. These dairy cattle were reported on 191,174 farms, which gives us a theoretical average of 4.9 cows per farm. Thus we find, if these data are reliable, that the average annual income from Pennsylvania cow is about \$48.

It is impossible to say definitely what the average production per cow is in Pennsylvania. If we use the census figures we find that the average production is only 441 gallons per cow, or about 3800 pounds. It should be said, however, that the number of cows taken to give this average includes all cows and heifers kept for milk 15½ months old and over, and consequently includes quite a large number of heifers which have not yet freshened. If we assume that 6½ per

cent. of all the dairy cows enumerated by the census were heifers which had not yet freshened, we arrive at an average production from the balance of them of about 4100 pounds of milk, and 165 pounds of butterfat.

The average production in 12 cow-testing associations in Pennsylvania, comprising 5000 cows, is not far from 5900 pounds of milk, or 246 pounds of butterfat. Some of this high production is undoubtedly due to the methods of cow-testing associations for we find that as soon as an association is organized the yield increases materially. The herds of cow-testing associations probably represent better and better kept herds than the average of the State.

This ratio of the production of untested herds to that of tested ones agrees fairly closely with that found in European countries, so a figure of 165 pounds of butterfat is probably as close to the average marketed production of the dairy cows in the State as can be calculated. In addition to this amount, some dairy products are consumed on the farm. I am constrained to believe, however, that the average consumption of dairy products on the farm is not very large, at any rate not nearly as large as they should be. On quite a number of farms butter is used quite sparingly because it has a market value, and quite frequently only a small pitcher of whole milk or cream is saved every day for the farmer's table. If I had the time I should like to have dwelt a little on this point, for I see no reason why the farmer should not have an abundance of dairy products for home consumption. I should like to see more whole milk consumed on the farm and I am sure that in many instances such things as cottage and neufchatel cheese would be welcome additions to the farm diet. I would like to see more dishes made with milk because of its wholesomeness and its value in the diet,—but I am straying from the subject.

Because of the high average production in cow-testing associations it would seem that if it were possible to form all the owners of dairy cows in Pennsylvania into cow-testing associations the average production per cow would, in the course of a very short time, be materially increased. Unfortunately this is not possible. You will remember that the average herd in Pennsylvania number less than five cows. Probably not more than 20 per cent. of the cows in Pennsylvania are owned in herds of sufficient size to receive the benefits of cow-testing association organization, since such organization requires herds of 12 cows or more. If my estimate is correct, the remainder, or four-fifths of all the dairy cows in Pennsylvania, are owned in herds of less than 12 cows. It seems to me that we can not hope to have any great improvement in the average production and the net profits unless we can devise some simple and feasible means whereby the owners of the four-fifths of the dairy cattle in Pennsylvania may be enabled to improve their stock. I believe some form of community breeding will offer such a means.

It is only in the last few years that we have heard about community breeding of dairy cattle as an idea worth considering in connection with plans for the advancement of our dairy industry. It may be doubted, however, whether community breeding as an original idea was ever the product of a human brain. The separation and per-

fection of the original types of cattle into recognized dairy and other breeds has taken place within the last 200 years, and is largely, if not altogether, the result of community breeding.

The first separation of the original cattle into varying types came undoubtedly as a result of varying rigors and vicissitudes of natural conditions. Later, considerations of food and comfort caused certain men and communities to become interested in certain distinct types of cattle, and by their planning of the breeding and weeding of the cattle they took over the work of an all-wise but slow Nature, and hastened this work toward perfection along lines specially adapted to their selfish ends. Transportation facilities and means of communication were crude, and there was little intercommunication between the various cattle-raising communities, and consequently little opportunity for intermixture of the blood of the cattle of different communities.

This community breeding is responsible for the development of the breeds of dairy cattle of to-day, but it is only in the last few years that nature has had the satisfaction of knowing that our eyes have at last been opened to the benefits to be derived by following the paths along which she has, by her work, endeavored to direct us. Even such outstanding examples of the benefits of community breeding as are offered by the history of the cattle industry of the Islands of Jersey and Guernsey have, until recently, wanted for appreciation.

I should be amiss in my duty to the historian of this subject should I fail to mention that organized community breeding found its first exponents in the little kingdom of Denmark, where the first community dairy-cattle-breeding-association was formed in 1874, and where there are now more than 1100 associations, with about 30,000 members.

In the United States organized attempts to foster community breeding of dairy cattle did not begin until about 1906, when a Guernsey breeders' association was organized at Waukesha, Wisconsin. As this probably marks the beginning of such work in this country, a review of the activities of the association by its secretary, Mr. Gavin McKerrow, will be of special interest. Mr. McKerrow states:

"The Waukesha County Guernsey Breeders' Association was organized in 1906 in Waukesha. It was organized by a few young men who saw the possibilities of community breeders' association work. At that time there was some Guernsey interest in the county, and in 1906 the census was taken, which showed that there were about 266 pure-bred and 500 grade Guernseys in the county. This organization has from the outset featured two lines of development; First, the improvement of home conditions, including an organized effort for the increase of Guernseys in the county; secondly, to aid in the marketing of the stock and dairy products of its members.

"The influence, on conditions in the county, of the semi-annual meetings has been an important feature. Every year since the organization of the association a winter meeting and banquet have been held in the city of Waukesha. These meetings are something more than a business gathering, and are considered of first value as an educational and social force, by the most prominent business men and farmers in the county. The very highest class of speakers

on agricultural topics have always been obtained. The association has been especially fortunate in having Rest Haven, one of the finest small hotels in the Middle West, as the place for its winter meetings. From 200 to 300 people are banqueted annually at this hotel by this association. The annual summer meetings are held at the farm of some of the members. Public interest in the summer meetings may be illustrated by the fact that we had 550 present. The influence of these meetings on the increase in number and quality of the Waukesha County Guernseys has been marked.

"In 1912 another census in Waukesha county was taken, and it was found that there were about 1500 purebred Guernseys. At present I should estimate the number to be about 2000. The quality of Waukesha county herds has risen considerably during the last six years. This has been evidenced not only in the show ring but also in the advanced registry work. In two years the Waukesha county record for butterfat production has risen from 649 to 846 pounds. The interest of the breeds in our association work is well illustrated by the fact that each member pays annual dues of \$3. There are 150 members in the association, and every man pays his dues every year or ceases to be a member.

"Along the lines of marketing the association has attempted to follow a square-deal policy, and to establish a reputation on this basis which will be lasting. Annual sales have been held for seven years with the strictest rules regarding health and reliability of the animals sold. This has been especially true for the last three years. Considerable advertising through the agricultural press has been done co-operatively by the association. These funds have been raised and distributed under the supervision of the board of directors. This has meant a uniform type of advertising."

The little town of Lake Mills, Wisconsin, is another example of what may be accomplished in community breeding. The early efforts of a few men in this community along the line of breeding Holstein-Friesian cattle resulted in the community acquiring a reputation for that breed. There was no local organization to foster this interest, but in a few years the community had acquired the name of being the greatest Holstein center in the Middle West, and buyers come there from all parts of the world to buy Holstein cattle. The breeders have been unable to supply the demand for stock, and have sold as high as \$175,000 worth of cattle in one year.

Those of you who have had occasion to inquire where good Holstein cattle could be secured in large numbers have, I am sure, been referred to Livingston County, Michigan. That county has 237 breeders of purebred Holstein cattle, the majority of whom are affiliated with one organization. The association issues a booklet which contains a history of the association and the advertisements of the several members. The county claims to have the largest number of breeders of purebred Holsteins to be found in any one county in the United States. A drover who has traveled this section for many years states that the fertility of the land has doubled during the last ten years. Silos and good dairy barns are now prevalent.

One advantage of the combining of farmers to raise one breed of cattle is the market created. Buyers from abroad recognize the advantage of having a number of herds in easy reach from which

to draw, and if one man has not a sufficient number, his neighbors will very likely complete the order. There is already almost a continuous string of cattle leaving the county—singly, in small lots, or in car lots. The breeders use up-to-date methods; no pains or money is spared to produce the best sires the country affords; and while every effort is made to maintain the high reputation of the cattle for constitution and vigor, the production records must please the prospective buyers. One of the best results achieved is the development of a co-operative spirit in the community, which reaches out into many other lines of agricultural activity besides improved live-stock breeding. One hundred and twenty-five breeders in Livingston county have 2500 Holstein cows, which are estimated to be worth \$750,000.

These associations are simply composed of breeders of purebred cattle, who band themselves together for the advancement of the breed, and who have especially agred to keep purebred Holstein bulls. So well, however, has this organized effort in the interest of the breed succeeded that these communities are now known as centers for the cattle of that breed in which the association has taken a special interest.

But it is not necessary for me to convince you of the advantages of community breeding. To you they are already apparent. Community breeding harmonizes the minds of men and centers them on one project. It increases the interest in their work, and a friendly competition is bound to result. It stimulates study of the characteristics and possibilities of the breed, and of the business. Many animals of the same breed found in one section of the country soon establish that section as center for the breed, and thus a market is created. When such a reputation has been established, the current prices of cattle usually run higher. Community breeding makes it possible for a farmer to secure in his own community such breeding stock as he needs to buy. It also gives opportunity for the exchange of bulls, thus saving money and at the same time securing bulls which have proved their merit.

In spite of all these advantages, community breeding, as an organized effort, has not made great strides in this country, and I believe it is largely because we have had no well defined plan for bringing it about. It is not enough for everybody in the community to keep the same breed of cattle. That alone is not community breeding. If it was we would see the value of community breeding prominently exemplified in the South, where nearly everybody keeps Jersey cattle but the South has not led other sections in the development of Jersey cattle. The same is true about the territories adjacent to our large cities where Holstein-Friesian cattle predominate. While the great majority of the farmers keep Holstein-Friesian cattle there has been little development of the breed in such centers.

In order for community breeding to be of greatest value, it must take the form of an organized effort, as a community, to further the interests of that particular breed. The Department of Agriculture has given years of study to this problem, and in 1908 organized a breeding circuit in North Dakota for the purpose of studying in detail some of the problems in connection with this work.

About that same time, Dean R. S. Shaw, of the Michigan Agricultural College, presented a plan of community breeding which has proven quite successful. This plan was, in brief, the organization of what is called a co-operative bull association for the joint ownership of purebred bulls. The first association of this kind was formed in Michigan in 1908. The next year four more were organized and the year after that three were organized in Michigan and one in Minnesota. From this small beginning the work has grown until we now have approximately 30 bull associations. The Dairy Division early took up this work, and now has a specialist who gives his entire attention to a study of the operation of these associations and the organization of new associations in different sections of the United States. The following table shows the number of dairy bull associations in operation July 1, 1915:

Dairy Bull Associations in Operation July 1, 1915

	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
Michigan,	1	4	7	6	10	15	15	14
Minnesota,		1	1	1	1	2	2	2
North Dakota,					1	2	1	1
Maryland,					1	1	1	1
Vermont,							1	1
Wisconsin,							1	1
Connecticut,								1
Maine,								1
	1	5	8	7	13	20	21	22

Approximate number of cows,	3,600
Approximate number of bulls owned by associations,	90
Approximate number of members,	540

You will remember that I mentioned earlier that probably four-fifths of all the cows on farms kept for milk in Pennsylvania are owned in herds of less than 12 cows. Let us consider, if you please, the conditions which prevail in such a small herd, especially with reference to its improvement. Say, for argument's sake, that the herd consists of about 8 cows. The owner, manifestly, can not be induced to keep a purebred bull of sufficient quality to improve the stock. Such a bull would cost him about \$150. If we assume that he keeps this bull two years and then sends him to the block and buys another bull, his bull service will have cost him \$150 for the two years. It is true that the bull has some beef value at the end of the two years, but this is offset by the cost of his keep. In other words, it would cost this man \$75 a year or about \$10 per cow for bull service, and if we assume that one-half of the calves are heifers the cost of bull service per heifer calf comes to about \$20, which, of course, is prohibitive. The consequence is that a man under these circumstances generally does not keep a bull, but breeds to his neighbor's bulls, and I think you will agree with me when I say that the usual custom in a herd of this size is to breed the cows to the nearest and handiest bull, which may be a Holstein one year, the next year may be a Guernsey, the year after that a Shorthorn,

and in other years what not? It is this condition which, to my mind, is largely responsible for our low average production, because under it very little improvement in the stock can be made in small herds.

The plan of a bull association makes it possible for the owners of such small herds to have the services of the very best bulls at a very small cost. A co-operative bull association is an organization of farmers owning small herds, primarily for the joint ownership and use of purebred bulls of the same breed. In its simplest form an association may consist of three farmers, who together purchase three bulls of the same breed. Each of these farmers keeps one of these bulls on his farm for two years, when the bulls are exchanged. Thus each member in the organization has the use of a pure bred bull for six years, for an initial investment equal to the cost of one bull. While this is the simplest form of a bull association the membership usually ranges from 5 to 60, and the bulls owned from 3 to 18. The association divides its territory into what are called breeding blocks. Each of these blocks contains from 40 to 60 cows. An association bull is stationed in each block, where he remains for two years for the service of the cows in that block. At the termination of this time in order to avoid inbreeding, each bull is exchanged for a bull of another block.

The investment required, which places within reach of each member a purebred bull, varies from \$20 to \$60 per member. It is usually the case that there are enough scrub bulls in the community in which a bull association is formed, so that the scrub bulls, if sold for \$50 each, will bring enough money to buy purebred bulls for the farmers at the price of \$150 to \$200 each, when the farmers are organized in a co-operative bull association. In other words, the co-operative bull association makes it possible to have purebred bulls instead of scrub bulls without any extra investment of money. Fewer bulls are owned, and thus the cost of keep is materially reduced, and instead of buying new bulls every two years to avoid inbreeding, the initial investment furnished bull service for six years or more. It is the quickest way for any owner of a small herd to get into pure breeding, for it strikes at the very worst obstacles in his way, namely, the cost.

To illustrate: Three farmers with one scrub bull each can raise \$150 by the sale of these animals, and \$150 will usually buy a good purebred bull, especially if the three men will use a little foresight and buy a young animal, or look around and find an older herd bull which must be discarded from the herd where he is in order to avoid inbreeding. Or, suppose that 25 farmers, owning 250 cows, club together and form a bull association with 5 blocks and buy 5 bulls at \$200 each, making a total investment of \$1,000. Generally there are enough scrub bulls kept by these members so that when sold for beef enough money can be raised to buy the five good bulls. This represents a total investment of \$1,000, or about \$4 per cow. At the end of two years the bulls are rotated. If none of the bulls die or otherwise get bad they will have bull service for ten years at the initial cost of about \$4 per cow, or 40 cents per cow per year.

One of the great benefits of bull associations is that it is possible to get a line on the value of the bull. Generally, no matter how good is the selection of the bulls, there will be one, and perhaps two of them, which will prove unsatisfactory and will have to be replaced by better bulls at the end of the third or fourth year. The bulls which do not produce good offspring will, in an association, be detected as soon as the progeny comes in milk and can be disposed of. At the present time a man buys a bull and uses him for two years when he disposes of him and buys another bull. Not until the heifers get in milk does he know definitely the value of a bull, and many famous bulls have been slaughtered before their outstanding breeding value was known. In a bull association such outstanding values get just recognition after the bull has been in the service two or three years and he is saved to perpetuate his good qualities to a much larger number of animals.

As mentioned before, the bulls are stationed in what are called breeding blocks, that is, in a place central to the farmers in that particular section of the association. Quite often one of the farmers of that block agrees to feed and care for the bull free of charge to the association for the convenience of having the bull on his own farm, and in that way the cost of keeping the bull is taken care of.

One of the first thoughts that has occurred to you in connection with this proposition, I am sure, is that contagious abortion will make it impossible to operate these associations. In our investigations, however, we find that this danger is a minor one, as far as the life of the association is concerned. In fact, conditions just as dangerous to the breeder are found where there is no organization. Examples of such conditions are found in the promiscuous breeding to neighbors' bulls, the buying of cows from herds where no knowledge of their health can be had, and the general cloak of concealment which exists where there is no organization. On the other hand, the co-operative bull association can be made useful as a weapon with which to fight contagious abortion; because every one of the members is alive to the danger of spreading contagious abortion, they watch the health and treatment of the bull with jealous care; and of the bull associations organized in the United States only one has disbanded, so far on account of contagious abortion.

One of the greatest difficulties in the way of the progress of bull associations at the present time is our lack of information concerning bulls; the production of bulls, dams and granddams and lack of systematized information concerning certain lines of breeding. The scientist, as well as the practical breeder, tells us that in order to attain the greatest development in the upbuilding of a herd we should follow line breeding. And where, for instance, would you go to-day to pick up five good bulls of the same line of breeding for a bull association? We hope, however, to be able to deal with this matter successfully and are now studying the records of a large number of animals of the various dairy breeds in an effort to get just such information as we need concerning the productive value of the various strains.

You are, I am sure, acquainted with the splendid progress made by the cow-testing association movement. I think I am safe in

predicting that on July 1, 1916, there will be 330 co-operative cow-testing associations in operation in the United States. I also believe there will be just as great a growth in the development of bull associations during the next ten years as there has been during the past ten years in the cow-testing association movement. It is a line of work which is especially adapted where the herds are small, and because of the large number of herds of this character I feel that it is very important work for us to undertake.

If any of you are especially interested in the details of the organization we shall be glad if you will write us and we will send you a tentative outline of constitution and by-laws for such an association.

PENNSYLVANIA STATE BOARD OF AGRICULTURE

At the conclusion of the reading of Prof. Rabild's paper, the State Board of Agriculture was reconvened, Vice-President Fenstermacher in the Chair, and the following business was transacted:

The CHAIRMAN: As per agreement, the State Board will now stand reconvened, and under the head of New Business, I will call on the Committee on Resolutions to report.

A Member: I believe I was the Chairman of that Committee. No resolutions have been handed to me; I didn't know anything about the matter.

The CHAIRMAN: Mr. Killam, Col. Woodward and Matthew Rodgers are members of that Committee.

MR. KILLAM: At this time your Committee would beg leave to report that we have drawn up a resolution as follows:

Whereas, The absence of our fellow member and co-worker, Bro. Joel A. Herr, of Clinton county, at this meeting of the State Board of Agriculture at Reading, Penna., May 22, 1916, at 10.30 A. M., is very noticable, and having learned with very much concern that he is physically unable to be here; we do now at this time and place, extend to him our sincere sympathy, regretting that we are unable to meet him as in the times past, hearken unto his counsel and deliberate with him as in former meetings, concerning the great agricultural problems to be worked out and solved;

We do at this time earnestly hope that all will be well with him, and that his voice may again be heard among us; that his influence as a member of the State Board of Agriculture, of which he has so many years been an honored and useful member, may continue.

B. F. KILLAM,
MATTHEW RODGERS,
W. H. STOUT,
Committee.

DR. TOWER: I move that that resolution be adopted and placed on the minutes and a copy be sent to the family at once.

(Motion seconded).

(The resolution was adopted).

The **CHAIRMAN:** Is there any further business? If not, a motion to adjourn will be in order.

There being no further business, on motion, the State Board then adjourned.

(Upon the adjournment of the State Board, the Farmers' Normal Institute re-convened, Dr. Conard in the Chair, and the program was resumed.

The **CHAIRMAN:** Next on the program is "Dairy Cattle Feeding," by Prof. A. A. Borland, of State College, Pa.

Prof. Borland delivered the following address:

FEEDING THE DAIRY COW

By A. A. BORLAND, *Professor of Dairy Husbandry Extension, State College, Pa.*

It has been said that the darkest of all dark places is the inside of a dairy cow. If we could turn on an electric light bulb in the inside of the body of the cow and watch the processes taking place there, we would be interested to note the wide variation in the uses to which different cows devote their food. Some animals seem to place the larger portion of their feed upon their bodies in the form of fat, others send it to the milk pail, while still others use it neither for body fat nor for milk but waste a large amount by their restlessness and nervous activity.

The Respiration Calorimeter

The most exact method of determining what the animal does with its food is by the use of the respiration calorimeter. This is a large compartment in which the animal may be closely confined and accurate data obtained as to the kind and amount of all the chemical elements supplied. The food is carefully weighed and analyzed, as is also the air which the animal breathes. This, the entire intake is accurately accounted for. The outgo is likewise determined. The excretory products are weighed and analyzed and the amount of heat or energy in the feces, urine, methane gas, breath, perspiration, and heat given off by the body is carefully computed. In this way the value of different foods is determined in terms of the energy they contain or are able to liberate when consumed by the animal.

While these determinations are still far from being complete, since the apparatus is costly, the number of calorimeters are few, and the amount of mathematical and analytical data involved is exceedingly large, yet investigators both in Europe and America have proceeded far enough to bring out facts of great interest and importance.

The Animal Body as a Machine

This method of determining the service of different foods to meet the needs of the animal takes into account the likeness of the animal body to a machine, such as a gasoline engine which requires both repair materials and fuel. The food substances which constitute the repair material for the animal body are water, ash, and protein, while carbohydrates and fat serve as a fuel supply, being largely burned up in the body to furnish heat and energy to run the animal machine. If more carbohydrates and fat are supplied than is necessary for the immediate use of the animal, the surplus may be stored up as reserve fuel in the form of fat. The following table gives the proportion of the different classes of nutrients entering into the average composition of the animal body and of milk.

Different Classes of Nutrients.

Use.	Nutrients.	Composition of animal body.	Composition of cow's milk.
Repair material,	{ Water,	56%	87.1%
	{ Ash,	5%	7%
	{ Protein,	18%	3.5%
Fuel,	{ Carbohydrates,		
	{ Fat,	21%	8.7%
		100%	100.0%

It is evident from the table that water is an important food substance making up 50% of the animal's body and over 87% of milk. It is the writer's belief that many dairymen lose sight of the importance of water as a food substance. When we stop to consider the large amount of water required by the dairy cow yielding a liberal amount of milk, it is plainly evident that not a few dairymen are losing milk by not supplying the cows with a sufficient quantity of water. Especially is this true in the winter time when some farmers turn their cows out in the storm and cold winter wind to go perhaps 500 yards down to a pond or brook, from which the ice must be broken before the cows are able to drink. Under such conditions, cows will usually not drink as much water as they would under more favorable circumstances and the result is a lessened milk yield. For the same reason, that is, the supplying of unstinted quantities of water to the dairy herd, the writer believes that it is worth while to water cows twice a day rather than once. In conversation with a prominent dairyman, the writer found that he had

secured from his herd over 30 pounds of fat more per cow the past year than during the preceeding year. Upon being asked the reason for this marked increase the dairyman replied that his judgment it was largely due to the fact that he was giving his cows more water than during the preceeding year. He stated that the last thing he did before going to bed was to go out to the barn and give the cows each a pail of water. Since he had culled out no cows and was feeding no more feed than the preceeding year the increased supply of fresh water was in his estimation the thing that counted for the increased yield. Since, however, water may be abundantly supplied in the drink, it need not be considered in the discussion of rations, except to emphasize the importance of a clean and plentiful supply.

Ash or mineral matter making up 5% of the body and .7 of one percent of milk, is seldom deficient in normally constituted rations. Clover, alfalfa and other leguminous plants are rich in ash. This is one reason why they are so valuable for young growing animals, since large quantities of mineral matter are needed by young animals for the growth of the skeleton.

Water and ash are usually sufficient. Protein on the other hand is apt to be deficient in the ration, made up largely of farm grown grains and roughage, and since protein is an especially important nutrient making up 18% of the animal body and 3 $\frac{1}{4}$ % milk, and entering largely into the composition of the muscles, hair, hide, hoof and horns and the vital organs of the body such as the heart, lungs, liver, brain and nerves, it is important that a sufficient amount be supplied to keep the organs of the body repaired. Nitrogen the characteristic element of protein is lacking in the other nutrients, hence, the animal body cannot manufacture protein from the other nutrients. On the other hand, protein will, to some extent take the place of carbohydrates and fat. An insufficient supply of protein fed to young animals checks their growth and development. Upon dairy cows the result of such feeding is seen in lessened milk flow and in long continued cases, the breaking down of the animal body. An excess of protein is likewise of no benefit to the animal, since the body does not store up superfluous protein but excretes the excess nitrogen through the urine. In fact, an over abundant supply of protein is a decided damage to the animal in that the excretory organs are simply worked over time, in getting rid of the excess nitrogen.

The fuel substances—carbohydrates and fat—make up 21% of the animal body and 8.7% of milk. These substances may be regarded as reserve fuel material stored up in the body, somewhat similar to the supply of gasoline carried along with the automobile to furnish the energy to run the machine. The unit of measure for the fuel, or energy value, of a feed is the "therm," which is the amount of heat required to raise the temperature of 1,000 pounds of water 4° F. If insufficient amounts of carbohydrates and fat are supplied, the animal becomes reduced in flesh and is finally forced to burn up expensive protein as fuel, which ought to be supplied by cheap carbohydrates. The feeding of excessive amounts of carbohydrates and fat, make a fat animal but does not increase the milk yield.

Maintenance and Milk

The question naturally arises as to what portion of the food is required to make good the wear and tear that is constantly going on in the animal body—the maintenance requirement—and what portion is available for milk production? The answer to this question depends upon the amount of food supplied to the animal. The amount of food that must be used to maintain the body depends upon the size of the animals and is practically a fixed quantity being the same from day to day regardless of whether little or much food is being supplied. It is evident, since the maintenance requirement is a fixed amount, that if only a small quantity of food is furnished, the animal must use most of it for maintenance and but little will be left for the manufacture of milk. On the other hand, if plentiful supplies of food are given the animal the percentage of it that is used for maintenance is much smaller than when the food supply is limited. This explains why the milk yield is much greater and the food cost of producing a quart is less with well fed cows than with an under fed herd. It likewise follows that animals may be given more food than they can profitably utilize for maintenance and milk, in which case the animal machine is not being handled at its maximum efficiency. The following diagrams, showing what becomes of the feed given a cow weighing 1,000 pounds and normally producing 20 pounds of 4% milk, will illustrate the point. It will be apparent that the proportions would vary according to the size of the cow, and the amount of milk being produced.

Fed too Much

Maintenance, 40%.	Production, 40%.	Stored up, 20%.
1000 pound cow.	20 pounds 4% milk.	Gain in weight.

Just Enough

Maintenance, 50%.	Production, 50%.	
1000 pound cow.	20 pounds 4% milk.	

Too Little

Maintenance, 66 $\frac{2}{3}$ %.	Production, 33 $\frac{1}{3}$ %.	
1000 pound cow.	10 pounds 4% milk.	

In the first diagram where the animal is fed too much, it is evident that 40% of the net energy in the food is used to maintain the body of this particular cow; 40% is used in the production of 20 pounds of 4% milk; and the remaining 20% is stored up as gain in weight. It should be remembered in this connection that while excess carbohydrates and fat go to make gain in weight, an excess of protein is largely lost to the animal so far as useful purposes are concerned since the excess nitrogen is excreted through the urine. When fed this ration the animal is not working at maximum efficiency since the amount of food supplied is more than can profitably be utilized for maintenance and milk.

The second diagram illustrates what takes place in the animal body when the proper amount of food is supplied. In this particular case 50% of the net energy in the food is used to maintain the body and 50% is used for milk production. With this amount of feed the cow evidently works at the highest efficiency since a greater percentage of the feed goes to milk production than in either of the other two cases.

The third diagram shows that when this cow is under-fed she must use the same amount of feed for maintenance as in the other two cases but in this instance of proportion of the total ration going to maintenance is 66 $\frac{2}{3}$ % leaving only 33 $\frac{1}{3}$ % for production. This amount is only sufficient for the production of 10 pounds of 4% milk. Evidently it does not pay to under-feed a cow, since the cut in the ration comes entirely on that portion that formerly went to make milk. By the diagram it may be seen that reducing the ration only $\frac{1}{2}$ from the amount that ought properly to be fed, leaves only half as much food as normally for milk production. When a dairyman goes to the trouble and expense of supplying the food for maintenance it is poor economy to withhold the other half that would ordinarily be used to purchase milk. As a matter of fact it has been found through experiment and also through the data gathered by Cow Testing Associations that the cows eating large amounts of feed usually yield large amounts of milk and much higher net profits after the feed bills have been paid than do smaller eaters. The amount of milk produced is usually in direct proportion to the amount of feed consumed over and above the maintenance requirement up to the limit of the cows ability to produce milk.

Feeding Standards

How then shall one know when a proper amount of feed is being supplied the dairy cow? A good general rule is to regulate the amount of grain by the amount of milk the cow produces, one pound of grain being fed for every three to four pounds of milk yielded. This amount of grain in addition to what roughage the cow will eat up clean twice daily will supply approximately the right amount of nutrients, for instance two cows weighing 1,000 pounds each, the one yielding 30 pounds of milk per day and the other 10 pounds milk per day require respectively 13 therms of net energy and 9 therms net energy. If we feed each one of these cows 1 pound of grain for 3 $\frac{1}{2}$ pounds of milk she produces, the first cow would receive 5.5 pounds grain and the second 2.75 pounds. If one pound of grain contains .75 therms energy there would be left in the first

case about 8 therms of energy to come from the roughage and in the second case 7 therms. The average cow will eat enough roughage to supply 7 or 8 therms of net energy. Therefore, by feeding grain in proportion to milk yield each of those cows has received about the proper amount of food. I have known dairymen who fed all the cows in the herd the same amount of grain regardless of the amount of milk the various cows were producing. This is certainly a very wasteful method of feeding. Were these dairymen to take the same amount of grain they are now feeding their herds and re-distribute it among their cows in proportion to the amount of milk each cow is giving, the yield of milk would be decidedly increased without one cent of additional expense.

A still more accurate method of determining the amount of feed that each cow should receive would be to feed the cows in accordance with the established feeding standards. Scientists have devoted lifetimes of study to the question of how much food a cow needs for maintenance and how much she needs for the production of milk. Wolff, Lehmann, and Kellner of Germany; Atwater, Haeker and Armsby of America might be mentioned among the many who have devoted much study to this question. The result of this vast amount of investigation and experiment has been the formation of feeding standards setting forth the amount of protein, carbohydrates and fat or energy that the cow needs for maintenance and milk production. While these standards may not be absolutely exact, yet they tell the actual needs of the animal so closely that the man who feeds his cows in accordance with their provisions will almost invariably secure better results than the man who feeds simply by guess. Bulletin 114 of the Pennsylvania Station and Bulletin 130 of the Minnesota Station outline Armsby's and Haeker's feeding standards respectively.

Proper Balance Between Protein and Energy

From the foregoing discussion it is evident that a proper balance should be maintained between protein, or repair material, on the one hand and carbohydrates and fat, or energy value, on the other, if one is to secure the best results from the food supplied to the dairy cows. "A balanced ration is the feed or combination of feeds furnishing the several nutrients—crude protein, carbohydrates and fat—in such proportion and amount as will properly and without excess of any nutrient nourish any given animal for 24 hours." A balanced ration is not indetical with an unlimited supply of food, since the ration is out of balance when it contains an excess of any nutrient as well as when it lacks in certain nutrients. For instance, a properly balanced ration for a cow producing 20 pounds of milk daily could never be secured from timothy hay, corn silage, corn meal, and oats or bran, no matter how liberally the cow was fed, for if she ate enough of the foregoing feeds to supply her protein requirements, the carbohydrates and fat would always be in excess and vice-versa if only enough of the foregoing feeds were consumed to meet the carbohydrates and fat requirements, the protein supply would be far below the standard. The following rations will serve as examples:

Poorly Balanced

Food Requirement (Armsby's Standard).	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds of 4% milk,	1.50	12.00	.....
10 lbs. timothy hay supplies, .....	.21	3.35	.09
30 lbs. corn silage supplies, .....	.27	4.96	.06
4 lbs. corn meal supplies, .....	.27	3.53	.06
2.5 lbs. wheat bran supplies, .....	.25	1.20	.085
Total food supplied,	1.00	13.03	.245
Difference from requirements,	-.50	+1.03	

This particular cow weighing 1,000 pounds and yielding 20 pounds of 4% milk needs 1.50 pounds of digestible protein and 1,200 therms of net energy in order to maintain her body and furnish material for the production of twenty pounds of 4% milk.

Now let us feed this cow such a ration as many farmers are feeding their cows, i. e. 10 pounds of timothy hay, 30 pounds of corn silage, and for grain 4 pounds of corn meal and 2.5 pounds of wheat bran. We find upon adding up the amounts of nutrients supplied by this ration that we have given this cow only 1 pound of protein whereas she needs 1.50 pounds. On the other hand we have supplied her with 13.03 therms of net energy whereas she needs only 12 therms. In other words we have given her only two-thirds as much protein as she needs and have supplied an excess of 1.03 therms of energy. What is the result? This cow has an insufficient amount of protein with which to manufacture 20 pounds of milk and, therefore, declines in her milk yield. On the other hand she has an excess of carbohydrates and fat, or net energy, and therefore fattens up. Then the farmer accuses the cow falsely of being to blame for the poor results. He thinks she is getting enough feed for he is giving her one pound of grain for three pounds of milk she produces and she is getting fat but is declining in her milk yield. As a matter of fact it is not the cows fault at all that she is decreasing in milk yield, it is the fault of the ration which has not supplied the material out of which to make milk but has given her an excess of the material with which to fatten up her body.

The foregoing ration could readily be put in balance by the substitution of two pounds of cottonseed meal for three pounds of corn meal. We would then have the following computation:

Well Balanced Ration

Food Required.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 lbs. 4% milk,	1.50	12.00	.....
10 pounds timothy hay supplies, .....	.21	3.35	\$0 09
30 pounds corn silage supplies, .....	.27	4.96	.06
1 pound corn meal supplies, .....	.07	.88	.015
2.5 pounds wheat bran supplies, .....	.25	1.20	.085
2 pounds cottonseed meal supplies, .....	.70	1.68	.04
Total food supplies,	1.50	12.07	\$0 24
Difference from standard, .....	.0	.07	

The substitution of two pounds of cottonseed meal for three pounds of corn meal has evidently so modified the ration that it meets the needs of the animal very closely. On this ration the cow could go ahead day in and day out and make 20 pounds of milk while with the first ration it would be impossible to maintain the yield. Furthermore, with the improved ration the total amount of grain fed per day and the cost of feed per day is less than with the unbalanced ration. The substitution of good clover hay for timothy hay in the poorly balanced ration would also do much toward putting it in proper balance. More milk for less money is certainly "a consummation devoutly to be wished" and might often be attained by dairymen through a modification of their present ration so that it would properly meet the needs of the animal.

Palatability

The palatability of the ration is important in that well liked feeds stimulate digestion and induce the animal to consume heavy rations. Some feeds are more or less distasteful to cows. For example, malt sprouts, brewers' grains, distillers' grains, gluten feed, and cottonseed meal. These should be mixed with those which are more palatable such as corn, oats, and wheat bran. A cow can be taught to eat almost any normal feed by mixing a small amount with that to which she is accustomed, gradually increasing the amount of the new feed. It is usually better, however, to have at least a fair proportion of palatable grain feeds in the mixture.

The following examples of unpalatable and palatable rations are given for illustration:

Unpalatable Ration

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1000 pound cow, 20 pounds 4% milk,	1.50	12.00	.....
10 pounds timothy hay, .....	.21	2.35	\$0.09
10 pounds corn stover, .....	.15	2.65	.04
5 pounds wheat straw, .....	.02	.85	.02
2 pounds gluten feed, .....	.40	1.58	.05
2 pounds brewers' dried grains, .....	.33	1.20	.03
2 pounds malt sprouts, .....	.24	.92	.03
2 pounds corn and cob meal, .....	.06	1.44	.03
Total food supplies,	1.52	12.02	\$0.23

While the foregoing ration supplies the needs of the animal so far as total food value is concerned, yet the ration is so unpalatable that the animal certainly would make but poor returns for the feed supplied. In fact it is doubtful whether a cow would eat such a grain mixture at all on account of its distastefulness. The situation would be similar to that of a man's having to live on "hard tack and salt pork." While he might be able to secure sufficient nourishment from such a diet, yet the lack of palatability would be such that he would eat as little as possible. We have already noted

that with dairy cows large consumption of feed is essential to a large and economical production of milk. The cost of this ration, \$.273 per day, is also high, since timothy hay is an expensive feed for dairy cows on account of its low food value and high market price.

Palatable Ration

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 lbs. 4% milk,	1.50	12.00	.....
10 pounds clover hay supplies, .....	.54	3.47	\$0.08
30 pounds corn silage supplies, .....	.27	4.96	.06
2 pounds corn meal supplies, .....	.14	1.78	.03
2 pounds wheat bran supplies, .....	.20	.96	.028
1 pound cottonseed meal, .....	.35	.84	.02
Total food supplied,	1.50	12.01	\$0.218

This latter ration furnishes the food requirements in a palatable and appetizing form. Not only is the total food value of the ration equal to that of the unpalatable combination but on account of the superior palatability of the latter ration it would be conducive to better yields than would be the former. Furthermore, the cost of the palatable ration is only \$.218 per day while the unpalatable ration costs \$.273 per day. This saving is effected by the use of clover hay and silage, both economical roughages, instead of timothy hay and by cottonseed meal for inexpensive protein and corn meal for low priced energy.

Succulence

A cow will not do her best unless she has succulent feed such as corn silage, roots, moistened beet pulp or June pasture grass. One reason why a cow always does her best in June is because she is getting plenty of succulent feed. Pasture grass is most abundant at this time, and furthermore is well balanced in its ratio of protein to carbohydrates and fat. If a cow is not giving a large amount of milk she will get along very nicely with no other feed save plenty of pasture grass. A cow producing 25 pounds of milk per day, however, can scarcely secure enough food from pasture grass alone to continue at a high level of production, and ought to have some grain in addition to her pasture.

When the pasture begins to dry up in July and August, how is a man to keep the milk flow from declining? There are two or three ways in which this may be done: First, one can feed the cow more grain. That is an expensive method, however. Second, one can feed soiling crops such as green oats and peas, millet, barley and peas, or green clover. Any of those crops fed during the shore pasture season will maintain the flow of milk. The objection of this system is that it calls for a considerable amount of labor at a busy

season. Third, one can put up enough silage to have a supply for the season of short pasture. I believe that the summer silo, that is one which is comparatively narrow in diameter, and which holds silage enough for the year around is the best and cheapest solution of this problem. Even those who are raising soiling crops frequently find that it is an advantage to cut these crops when they are at their best and put them into the silo to be fed out as needed.

Roots are also an excellent succulent feed. Their chief value lies in their high palatability and succulence rather than in their food value. Mangels are the best root crop for the dairy farmer to raise. The Cornell Experiment Station found that 10 pounds of mangels would take the place of one pound of grain up to the extent of half the grain allowance without causing any diminution of the milk flow. This means that the dairymen with clover hay, corn silage and mangels at hand can get along with the minimum amount of grain and can largely escape that greatest drawback to dairying, the large bill for purchased feeds. Roots, however, are expensive as compared with silage. There is a lot of labor connected with raising them. At the Pennsylvania Station it was found that the cost of 100 pounds of dry matter in roots was five times as great as with corn silage. The man with a limited amount of land had better raise only corn silage. The man with more land can well afford to raise both silage and roots, in order to lessen the purchased feed bill. Apple pomace silage is another succulent feed that is worthy of consideration, since it is nearly equal to average corn silage in feeding value.

If no succulence of any kind is available with the roughage the grain mixture should contain some laxative feeds such as wheat bran or linseed meal in order to impart the desired laxative qualities to the ration. The following rations are given as examples of non-succulent and succulent rations:

Ration Lack Succulence

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	.....
10 pounds timothy hay supplies, .....	.21	3.35	\$0.00
15 pounds corn stover supplies, .....	.27	3.98	.06
3 pounds corn and cob meal, .....	.12	2.16	.035
1 pound gluten feed, .....	.20	.79	.013
2 pounds cottonseed meal, .....	.70	1.68	.04
Total food supplied,	1.51	11.96	\$0.244

The foregoing ration furnishes sufficient food for a thousand pound cow yield 20 pounds of 4% milk but the ration lacks succulence. No silage or roots appear in the ration, neither is this lack of succulence in the roughage counterbalanced by laxatives in the grain mixture such as wheat bran or linseed meal.

Ration Contains Sufficient Succulence

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	.....
10 pounds clover hay supplies, .....	.54	3.47	\$0.08
50 pounds corn silage supplies, .....	.27	4.96	.06
2.5 pounds corn and cob meal, .....	.11	1.80	.08
1.2 pounds gluten feed, .....	.24	.95	.021
1 pound cottonseed meal, .....	.35	.84	.08
Total food supplied,	1.51	12.02	\$0.211

The substitution of clover hay and corn silage in the place of timothy hay and corn stover supplies the needed succulence, and permits the use not only of less grain to complete the ration since more protein is supplied by the clover hay than by timothy, but also of a cheaper grain mixture since it is not necessary to use so much of the high protein feeds which command a high market price. The cost of the ration has been reduced from \$.244 per day to \$.211 per day.

Healthfulness

The feeds given the dairy cow should be such as will be conducive to the health of the animal and the quality of the product. An excess of either constipating or laxative feeds should be avoided. Timothy hay, corn stover and cottonseed meal are constipating. For this reason cottonseed meal should be fed with laxative concentrates or with succulent roughages. The milk of cows fed heavily on cottonseed meal yields hard, tallowy butterfat, light in color and poor in flavor. Excessive amount of cottonseed meal may be poisonous to the animal. If dairy cows are fed moderate allowances in a properly balanced ration no harmful results ensue. The quality of the product is not impaired but may even be improved if the other feeds tend to produce a soft butter. A safe maximum allowance of cottonseed meal per cow per day is four pounds and the grain mixture not over one-third cottonseed meal.

Corn silage, roots, pasture grass, leguminous hay, wheat bran, and linseed meal are laxatives and should not form the entire ration. Linseed meal, while a perfectly safe feed, is so laxative in its nature that, as a general rule, is should not be fed in such amounts as to give more than a pound and a half to each cow daily. Opposite in effect to cottonseed meal, linseed meal tends to produce a soft butter fat, and is best adapted to rations lacking in succulent roughage. The following are given as examples of unhealthful and healthful rations:

Unhealthful Ration—Too Constipating

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	.....
10 pounds timothy hay supplies, .....	.21	3.35	\$0.09
15 pounds corn stover, .....	.27	3.98	.06
3.5 pounds corn and cob meal, .....	.16	2.25	.043
2.5 pounds cottonseed meal, .....	.88	2.11	.05
Total food supplies,	1.52	11.96	\$0.243

The foregoing ration would be detrimental to the health of the animal, even though it does supply enough nourishment. The feeds are all so constipating in this nature that the effects upon the alimentary tract would be injurious. The following ration is equally bad but in exactly the opposite direction, being too laxative.

Unhealthy Ration—Too Laxative

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
10 pounds clover hay supplies, .....	.54	3.47	\$0.08
35 pounds corn silage supplies, .....	.31	5.73	.07
2.25 pounds wheat bran supplies, .....	.23	1.08	.082
1.00 pound ground oats supplies, .....	.08	.66	.015
1.25 pounds linseed meal supplies, .....	.34	.99	.038
Total food supplied,	1.50	11.96	\$0.223

This ration is so largely made up of laxative feeds that it would most certainly be an ill-advised combination to feed milk cows, unless it were upon special occasions. A happy means betwixt extremes so far as laxative and constipating feeds are concerned is desirable.

Healthful Ration

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	.....
10 pounds clover hay supplies, .....	.54	3.47	\$0.08
30 pounds corn silage supplies, .....	.27	4.96	.06
2 pounds corn and cob meal, .....	.09	1.44	.024
1 pound ground oats, .....	.08	.66	.015
.8 pound gluten feed, .....	.16	.64	.014
1. pound cottonseed meal, .....	.35	.84	.02
Total food supplied,	1.49	12.01	\$0.212

This ration in addition to being as well balanced as the immediately preceding ones is more economical than either of the foregoing and is so compounded that part of the nutrients come from laxative feeds and part from constipating feeds. There is no doubt that this ration would give better results for less money than would the rations listed as unhealthy.

Bulk

For the best results the proportion of concentrates and roughages in the ration should be regulated according to the size of the cow and the milk yielded. The grain mixture should contain some light bulky feeds, such as wheat bran, distillers' dried grains in combination with heavier feeds, such as corn meal, cottonseed meal on account of the physical effects of such a mixture.

The amount of grain fed should be regulated by the amount of milk the cow produces. One pound of grain for each three or four pounds of milk is a good general rule. This amount of grain, in addition to what roughage the cow will eat up clean twice per day should insure economical feeding. When hay alone forms the roughage the cow will need about two pounds per day per hundred pounds of live weight. If hay and silage form the roughage, one pound of hay and three pounds of silage, per hundred pounds of live weight of animal is a fair allowance, the object being to provide sufficient bulk to satisfy the appetite and the feeding capacity of the animal. Whether one should feed a large or a small amount of roughage in proportion to the grain allowance depends largely upon the comparative price of grain and roughage. Should the roughage be scarce and high priced then it will be economical to use a small allowance of it and complete the ration with mill by-products. On the other hand if roughage is abundant and moderate in price it will be more economical to use a liberal allowance of home grown clover or alfalfa hay and corn silage in order that the cost of purchased feeds be kept as low as possible. The following are given as examples of rations, one of which is concentrated, the larger portion of the nutrients coming from grains; and the other bulky, the larger portion of the nutrients coming from the roughage:

Concentrated Ration

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	.....
7 pounds clover hay supplies, .....	.38	2.43	\$0.056
20 pounds corn silage supplies, .....	.18	3.31	.04
4.5 pounds corn meal supplies, .....	.30	4.00	0.68
8.0 pounds wheat bran supplies, .....	.30	1.44	.042
1.0 pound cottonseed meal supplies, .....	.35	.84	.042
Total food supplied,	1.51	12.02	\$0.226

The foregoing ration contains but a limited amount of roughage, the food requirements coming largely from grain. This ration would be desirable only when roughage was scarce or high in price and grain concentrates comparatively cheap.

Bulky Ration

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	.....
12 pounds clover hay supplies, .....	.65	4.17	\$0.096
35 pounds corn silage supplies, .....	.31	5.79	.707
5 pounds corn meal supplies, .....	.03	.44	.006
1.6 pounds wheat bran supplies, .....	.16	.77	.022
1.0 pound cottonseed meal supplies, .....	.35	.84	.02
Total food supplied,	1.50	12.01	\$0.216

The foregoing ration allows a liberal supply of roughage and but a small amount of grain. It is evident from a comparison of the cost of the concentrated ration with that of the bulky one, that it is usually an economical dairy practice to supply a liberal amount of farm grown roughages in order to minimize the amount of grain that must be purchased. The concentrated ration cost \$.226 per day while the bulky ration costs but \$.216 per day. Moreover a ready market is furnished in this way for large amounts of farm grown hay and silage.

Variety

The ration composed of a variety of feeds will usually give better results than when a smaller number are employed even though the latter does contain the necessary amount of nutrients. Two or more roughages, one leguminous and one succulent in character are desirable; while the grain mixture should contain at least three different concentrates. Especially in the case of high producing cows that are being forced for official tests is it desirable to have a variety in the ration, although this does not imply that there should be sudden changes in the ration from day to day. In fact sudden changes in the rations are to be avoided. The better plan is to adjust the supply of feed so that the ration can be made from two kinds of roughages and several different grains; then make no more changes during the feeding season than are necessary. The following rations are given to illustrate the point:

Ration Lacks Variety

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	.....
21 pounds clover hay supplies,	1.14	7.30	\$0.18
5.3 pounds corn supplies, .....	.36	4.71	.06
Total food supplied,	1.50	12.00	\$0.24

The foregoing ration shows that so far as food requirements are concerned they may be met by a single roughage and a single grain. Owing to the lack of variety, however, the yield of milk from cows fed such a ration would probably be decidedly lower than from cows fed a greater variety of feeds. The ration is expensive and the cows would be more apt to tire of it than with one of greater variety, somewhat similarly as the human species of animal would tire of a constant ration of nothing but dry bread and salt pork.

Ration with a Variety of Feeds

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	.....
10 pounds clover hay supplies, .....	.54	3.47	\$0.08
30 pounds corn silage supplies, .....	.27	4.96	.08
1.5 pounds corn meal supplies, .....	.10	1.33	.023
1.5 pounds wheat bran supplies, .....	.15	.72	.021
.5 pound ground oats supplies, .....	.04	.33	.007
.8 pound gluten feed supplies, .....	.16	.63	.014
.7 pound cottonseed meal supplies, .....	.25	.59	.014
Total food supplied,	1.51	12.08	\$0.219

This is a palatable, nutritious ration with sufficient variety to prevent any flagging in the appetite of the animal. The milk yield would be well sustained from day to day on a ration having the variety of appetizing feeds listed therein. At the same time the cost of the ration is only \$.219 cents per day as compared with \$.248 for the ration lacking variety.

Cost

The cost of the ration is one of the most important factors for the farmer who must depend upon the returns from his dairy herd for his living. The market price of a grain fed gives very little indication of its economy. The true index is the relative cost at which it furnishes digestible protein and net energy. There are many feeds on the market selling for a low price which contain so little food value that they are in reality expensive when compared with standard feeds having a higher market price. In making up the grain mixture one should combine those feeds which furnish digestible protein at a low cost with those furnishing net energy at a low cost. The final results should be an economical ration which furnishes the proper amount of protein and energy and which at the same time is palatable, healthful, and is composed of a variety of feeds. The following table shows the composition, market price and the economy of various concentrates and roughages:

Economy of Feeds

	Vegetable protein per cwt.	T. energy per cwt.	Market price per cwt.	Cost of 100 lbs. digestible pro- tein.	Cost of 100 T. energy.
Barley,	8	81	\$1 80	\$23 50	\$3 22
Brewers' dried grains,	19	60	1 45	7 64	2 42
Corn meal,	7	89	1 50	21 40	1 71
Cottonseed meal,	35	84	2 00	5 71	2 38
Distillers' dried grains (corn),	22	79	1 85	8 41	2 22
Gluten feed,	20	79	1 75	8 75	2 28
Hominy,	7	89	1 46	20 71	1 61
Linseed meal (new process),	27	79	2 10	7 77	2 78
Oats,	8	66	1 50	18 50	2 23
Wheat bran,	10	48	1 40	14 00	2 22
Clover hay,	5.4	35	80	14 80	2 23
Mixed hay,	3.7	34	85	23 00	2 50
Timothy hay,	2.0	33	90	45 00	2 73
Corn stover,	1.3	27	40	23 20	1 50
Corn silage, .....	.9	17	20	23 50	1 18

The digestible content of barley according to the table is low as is also that of corn meal, hominy and oats. In order to be satisfactory in a dairy ration these low protein feeds ought to be combined with those which are higher in protein, i. e. brewers' dried grains, cottonseed meal, distillers' dried grains from corn, gluten feed and linseed meal. Clover hay contains 2.7 times as much protein as timothy hay, a fact which explains why clover is so much better adapted to dairy cattle feeding than is timothy. Corn stover is almost equal to timothy hay in feeding value. The farmer who allows corn stover to go to waste while feeding timothy makes a bad mistake. If he has more roughage than is necessary to carry his herd through the winter he had better sell timothy hay, which commands a high market price owing to the demand for it for feeding horses, and feed the corn stover to his cows, thereby securing almost equal returns at much less cost.

The energy or fuel value of brewers' dried grains, oats and bran is low. These evidently are not fattening feeds as their heat value is low. On the other hand barley, corn, cottonseed meal and hominy are high in energy value and are heating in their nature. Clover hay is higher in fuel value than timothy hay and corn stover nearly as high as the latter. Corn silage has about one-half the food value of timothy hay or corn stover.

The market price of feeds given is that of the Pennsylvania State College. It is likely that prices at other locations would vary somewhat, but probably the whole range of prices would be slightly higher or lower so that the comparison of economy between different feeds will be approximately correct for other locations.

The cost of 100 pounds of protein is high with barley, corn, hominy, oats and bran, while it is low with dried brewers' grains, cottonseed meal, distillers' dried grains from corn, gluten feed and linseed meal. Cottonseed meal at \$2.00 per cwt. is an especially economical protein feed since it furnishes 100 pounds of digestible protein for \$5.71 the lowest cost for protein of any of the feeds mentioned. Clover hay furnishes protein at a lower cost than any other roughage mentioned, \$14.80, while timothy hay charges the enormous price of \$45.00 for 100 pounds of digestible protein. This high cost of protein in timothy hay is caused by the combination of high market price and low food value. The writer conversed recently with a dairyman who sold his timothy hay last fall and purchased alfalfa hay in its place at only a few cents higher cost per ton. The saving thus effected, owing to the greater feeding value of the alfalfa hay, amounted to a considerable sum of money by the end of the feeding season.

The cost of 100 therms of energy is found to be lowest with such concentrates as corn meal and hominy. The roughages that furnish energy at low cost are corn stover and corn silage which is the most economical energy feed at \$4.00 per ton to be had furnishing energy at the very low cost of only \$1.18 per hundred therms of energy.

An economical ration evidently would be secured by selecting such concentrates as furnish protein at low cost e. g. cottonseed meal, gluten feed, and distillers' dried grains and combining them

with economical energy feeds such as corn meal and hominy. Then as a roughage we would combine clover hay, the most economical protein roughage with corn silage, the most economical energy roughage. The following examples of costly and economical rations are given for illustration:

Expensive Ration

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	.....
20 pounds timothy hay supplies, .....	.41	6.71	\$0.18
1 pound corn meal supplies, .....	.07	.39	.015
2 pounds ground oats supplies, .....	.17	1.86	.03
3 pounds wheat bran supplies, .....	.30	1.44	.042
3 pounds linseed meal supplies, .....	.55	1.58	.042
Total food supplies,	1.50	11.95	\$0.309

The feeding of such a ration as the foregoing is an expensive proposition. Timothy hay is an expensive roughage being low in food value and high in market price. Not only is timothy hay expensive in itself but owing to its low food value it requires a large amount of grain to complete the food requirements of the animal. Furthermore, the grain mixture is an expensive one, since a considerable amount of high protein concentrates are necessary. Protein as has already been stated is a costly nutrient to purchase. The total cost of the ration is nearly 31c. per day. The yield of milk would be sufficient to make about one pound of butter. This would sell for but little more than 31c. as the average for the year. It is, therefore, evident that with timothy hay as the roughage there is a very close margin between the cost of production and the selling price of the product.

Economical Ration

Food Requirements.	Pounds Protein.	Therms Energy.	Cost.
1,000 pound cow, 20 pounds 4% milk,	1.50	12.00	.....
10 pounds clover hay supplies, .....	.54	2.47	\$0.08
30 pounds corn silage supplies, .....	.27	4.96	.06
2.5 pounds corn and cob meal, .....	.11	1.80	.03
.8 pound gluten feed, .....	.16	.63	.014
.8 pound brewers' dried grains, .....	.15	.48	.012
.8 pound cottonseed meal, .....	.28	.67	.016
Total food supplied,	1.51	12.01	\$0.212

In place of timothy hay this ration uses clover hay and corn silage which form a palatable, nutritious and succulent roughage, high in food value and low in cost. This roughage combination requires but a comparatively small amount of an inexpensive grain mixture to complete the ration. With timothy hay as a roughage 8 pounds of an expensive grain mixture were needed to complete the food requirements; with clover hay and corn silage as roughage less than 5 pounds of an inexpensive grain mixture are needed.

The clover hay and silage ought to be grown upon the dairy farm, and on many farms corn can be grown to furnish the corn and cob meal in which case over half the grain mixture would be home grown, leaving but a small amount of concentrates to be purchased. The cost of the expensive ration was 31c. per day while that of the economical ration is 21c. per day, a saving of 10c. per day on the feed bill for each and every cow in the herd, producing 20 pounds of 4% milk per day. Were the milk yield greater than 20 pounds daily, the saving would be correspondingly increased. Through the use of leguminous hay and cheap succulence such as corn silage, together with grain from corn it is possible to go far toward supplying the dairy herd with a healthful, well balanced and economical ration.

The CHAIRMAN: I think that Mr. McGowan has something to say.

MR. MCGOWAN: I am always annoying the audience with announcements, but some one has to do that unpleasant work. At the close of the session this afternoon, we propose going out to the new Fair Grounds in automobiles, so at the close of the session, whenever that is I suppose they will patiently wait until we are through here—there will be plenty of automobiles for you to go out to the grounds and bring you back before six o'clock. The people of our county and city have spent over a hundred thousand dollars, paid the money down, and we have new buildings worth while seeing and want you all to go and will bring you back before six. The evening's program is a very interesting one and the Belgian Relief Committees have secured a period at the close of the evening's session, when Dr. Blackburn will deliver a lecture. This is by permission of the Deputy Secretary, Mr. C. E. Carothers, and we expect to have a little music for the evening session.

The CHAIRMAN: The next number is "Economic Factors in Beef Production," by Prof. W. H. Tomhave, of the Department of Animal Husbandry, State College, Pa.

Prof. Tomhave spoke as follows:

ECONOMIC FACTORS IN BEEF PRODUCTION

By PROF. W. H. TOMHAVE, *State College, Pa.*

This subject is one that is broad in scope and we could spend a good deal of time in discussing the various phases of it; but I want to call your attention to one or two important factors that I have in mind, possibly dwelling a few minutes upon some of the changes that have taken place in the beef industry during the past 25 years.

Beef production is an old established practice in the State of Pennsylvania, as many of you know. It has been a part of the busi-

ness of farming in Pennsylvania, and I am glad to say that those who have practiced it I believe have gotten some most excellent results in spite of the fact that frequently they have encountered difficulties and have had competition that has been keen, especially from other sections of the country. Prior to 1908, very little consideration was given to the cost of production. Up to that time practically all the experiments that were being conducted were conducted primarily to determine the kind of ration that would give us gains per head daily for the ration, that would give us the greatest number of pounds of gain regardless of cost, but with the increase in the price of feed and with the increase in the price of lamb and the demand for grains for human feed, it became necessary to give the matter of the cost of production some consideration, and since that time a great deal of valuable work has been done at a number of experiment stations as well as by practical feeders, to work out some of the phases of the cost of production, and I am glad to say that we are getting some light on the subject, and it is remarkable the changes that the practice of feeding is undergoing. The practice has been entirely revolutionized, entirely changed in the last five or ten years, as I hope to show you in a few minutes.

Another thing that we should keep in mind is this, that wherever beef production has been carried on, we find our best farms. You have sections of this State, go where you will, in different parts of the United States where livestock has been a part of the business of farming, and there you find prosperous homes, land high in value, and the farmers have money in the banks. Not that I maintain that all the money is made out of livestock, but simply because the farmers had the livestock, possibly as a side issue, it was possible for them to keep up the fertility of the land. Their income was not from one source alone; they were able to increase the value of the land; increase the fertility, build it up, make it more valuable from year to year rather than have it depleted in soil fertility, depleted in humus and reach the stage where it ceased to produce in spite of all the commercial fertilizers they care to purchase. I believe every man here will bear me out in that statement.

Now we have in this State, to my mind, wonderful opportunities for beef production. We have natural resources that are especially well adapted to beef production. Pennsylvania is naturally a grazing State, a state well adapted to the production of roughage, such as hay, corn silage and feeds of that character. Our problem is not to find a market for grain, we have a market for all the grains we produce; besides that we ship in thousands of thousands of bushels of grain of one kind and another to feed our livestock, both on farms and in the city, but what we want is some means of disposing of the roughage produced, keep it on the farm, marketing it through livestock and putting it back on the land. Furthermore we have hundreds and thousands of acres in this State being cultivated today that ought to be utilized in livestock production, that is to say, put upon those hillsides in these rough areas that are difficult to till, animals that would graze over those areas and give us the returns from that land in that way; and the animals especially adapted for work of that kind are beef cattle and sheep.

The Pennsylvania breeder or the Pennsylvania farmer has this problem to meet; in the first place, he must have his feeding cattle. In the past we have been in the habit of going to Western markets, Virginia and other sections where feeds have been produced, to get our supplies; but what are the conditions confronting us today? The price of feeders is going up year after year, and the margin between the price of feeders and the price of cattle is getting so narrow that it is difficult to continue in the feeding business at the present increase in the price of feeding cattle. In 1912, we were able to buy our feeding cattle at approximately between five and six cents a pound in West Virginia, southwest Pennsylvania and on the Pittsburgh market. In 1913-14 we paid about a dollar more. In 1915 we paid about fifty cents more, and yet the price we have received from finished cattle this spring has not increased in proportion to the price we paid for feeding cattle. Why? Simply because the number of feeding cattle that are being produced in the country today to be sold as feeders to the men that feed during the winter, are becoming scarcer every year. That means that the Pennsylvania farmer must solve his problem by the production of more feeding cattle in this State. I believe there are large areas where that can be done.

The first thing we must solve then is the cost of maintaining the beef-breeding herd. Up to a few years ago, it was generally considered that it was unprofitable and impracticable under the average farming conditions to maintain a beef cow for the calf she produced. I am happy to say that experiment stations and practical men are now getting results from their work showing that it is possible to maintain a beef-breeding cow for the calf she produces and may make a profitable source of income. There are certain factors however that we must keep in mind in beef production. In the first place, get the proper kind of an animal, the proper type of animal, one that will utilize its foods to the best advantage. You cannot take any old scrub and expect it to give you good returns in the feed line. The dairyman tells you that is true and the beef man will tell you that is true, because there is too much waste and the animal does not utilize the feed to advantage. So first of all, you must have a proper kind of animal. Then in the second place you must keep down the cost of feeding. The minute you begin to feed expensive grains, you are going to increase the cost of maintenance. In the third place, you must keep down the cost of shelter or the investment, the capital invested in your equipment. In the fourth place, keep down the cost of labor. That is a problem we must meet. We must meet the competition from the industrial centers, from the manufacturers, and must devise some scheme whereby the labor required can be reduced to a minimum, and furthermore the operations must be so arranged that the labor can be distributed throughout the entire year and that most of the labor is required during the winter months.

I am going to just call your attention to a few facts brought out in these charts. Five years ago this last fall we started an experiment,—I have discussed part of this experiment before some of you men before,—to determine the cost of maintaining a herd of beef-breeding cows, taking pure bred animals purchased in different sections

of the State, all pure bred, and building up a herd by the use of good, pure bred sires. We were rather unfortunate in the beginning to get cows the breeding record of which we did not know. In other words, we got some cows that were barren, some that were not regular feeders, and the result was that we had to keep on culling until today we have a herd that is giving us 100 per cent. calves; every cow in the herd today has produced a calf within the last year. Then, at the time we started with 20 pure bred cows, 10 Aberdeens and 10 Shorthorns, simply taking those two breeds because we found the greatest number in the State of Pennsylvania. Then, in selecting the feed, we found that corn silage was being produced in every section of the State and more ought to be produced, so we used that as far as the basis was concerned, and supplemented that with cotton seed meal, which is high in protein.

I am going to look over this very briefly, simply calling attention to a few of the figures giving the results of the first three winters work. I did not have time to compile the data for the last two winters, but the results are more favorable than the first three. You notice that the cows there received all of the corn silage they would consume and consumed an average of almost 59 pounds in lot 1 and 58 in lot 2. They were limited to 1 pound of cotton seed meal per head daily. These were mature cows. Then the average cost of feed, corn silage at \$3.50 a pound and cottonseed meal at \$30.00 a ton. Comparatively a small amount was fed each day; even though we increased that to \$40.00 a ton, it would mean only an increase of one-half a cent a day, or approximately 75 cents for the winter. Then we kept a record of bedding required for these cows, charging straw at \$8.00, which made for each cow \$4.35 for bedding; labor at 15 cents per hour, \$2.33 for labor to take care of one cow. Value of manure produced, \$7.32. That is a fair average of what you can do. The one thing you must keep in mind is to have a good working unit, and the same thing must be true in business of any kind. This gives you a summary for the three summers; length of the summer period, 210 days; and bear in mind that where you have grazing lands, you can keep down the cost of production if you can utilize grass for a long period, for the longer the period the more favorable your conditions. Interest on pasture land, land for cow, \$5.60; for calf, 33 cents. Labor cost, 15 cents per hour, is simply a matter of looking at the cows occasionally, seeing that everything is in good condition and salting the cows, 80 cents per head.

Now, in that connection remember that this pasture land, properly handled, will increase in value from year to year where cattle are grazing over the land. This same area three years ago was a poor, run down pasture; nothing has benefited it except the cattle grazing over it, and it is almost 100 per cent. better today than three years ago. Part of it was a cornfield five years ago and never had a bit of grass upon it. Bluegrass comes in naturally on limestone soil. This gives a summary for the three years, \$17.61 in lot 1 and \$17.50 in lot 2; \$5.40 interest on the value of the cow. That is something you should charge. These cows were purchased at \$75-\$100 per head. Service of sire charged at the rate of \$2.00 per year. Interest on the value of equipment and depreciation, \$1.50 per

cow, making a total of \$33.54 in one case and \$34.11 in the other case. In return for that you must have a calf to pay that bill. Now this figure simply shows the first three years' work. You notice that in the case of the Shorthorns, less than 50 per cent. had calves; the last two years we have had 90 per cent. and 100 per cent. of calves. The consequence is that our results are far more favorable at the present time than during the first three years. This gives the weight of the calf at time of birth and the average weight 12 months later, 671 pounds Shorthorn and 588 in the Aberdeen lot.

Here is a thing we must reckon with. This was the value of the calf at 12 months of age; 100 per cent. of calves, charging everything, pasture after four months and the feed they consumed, would cost \$38.26 (reads the table). In other words, you must have at least 70 per cent. of calves in your herd in order to break even on this proposition at the price that prevailed at that time, the calves being valued at \$8.00 per hundred when they were disposed of, and when you get down below that, you will be working on a losing proposition. So, in figuring the cost of maintaining a beef-breeding herd, a thing you want to keep in mind is regular breeders, cows of beef type that are good milkers, cows that are good milkers. I would pay more attention to getting a cow that is going to give me a good supply of milk, and use a good, pure bred bull of the beef type, rather than take a cow of the extreme beef type that does not give enough milk to maintain her calf. We have a cow in our herd that none of you would pick, possibly, as the ideal beef type, a pure bred Shorthorn cow giving lots of milk, bred to a good beef-bred Shorthorn bull, and she has the best calf ever dropped on the place, because she has the food necessary to grow a good calf; so do not overlook the element of milk in a beef animal. The old saying that a beef cow does not have to produce milk is all wrong; she has got to produce sufficient milk to grow that calf up and grow him in good shape or she is better off in the hands of the butcher than in your hands, and very often you can use a cow that is not of as pronounced beef type as you would like, and a good beef bull, and you will get a calf that, as a commercial proposition, is going to grow into weight quickly and will make you more money than a cow that is not a good milker and is of the extreme beef type. So get a good milk cow and your bull as near the beef type as you can possibly get hold of. If you can get the milking qualities combined with that beef type, that is what you want.

I just want to call your attention to another chart; this simply gives the results of fattening the calves of that herd the first year (reads the table).

A Member: What was the age of those calves?

PROF. TOMHAVE: Running around twenty months when they were sold. This year we just disposed of our calves out of this lot from this same breeding, and the calves sold right on the place at \$9.50 a hundred, right in the barnyard, fed and watered at night and weighed at seven the next morning; we sold them at 9½ cents, averaging a little over \$90.00 per head, when they were 18 months of age, nursed the calves until they were 8 months of age, then

they went on pasture the balance of the summer, and last fall we put them in the feeding lot, fed them 160 days, and they received corn silage, corn meal and cottonseed meal, and returned a very substantial profit. Now I want to just call your attention to a few rations in steer feeding.

The chart I have here covers our last year's work. That is one of the problems we must meet, namely, the rations to feed our cattle in the feed lot. The steers were divided into three different lots, or five different lots, I should say. Our experiments up to the last few years indicated that whenever we fed a large amount of roughage, made up largely of corn silage during the early part of the feeding period, supplemented with grain the latter part of the feeding period, and cotton seed meal throughout the entire feeding period, that gave us the greatest returns; so here we have what we commonly call the Pennsylvania ration, one that does not include corn silage. That does not apply to everybody; because a great many farmers are feeding corn silage, but it is the ration we fed a great many years. (Reads from the chart). This is the average amount of feed consumed during the entire feeding period. This lot over here gives the average weight, showing that they weighed approximately 900 pounds at the beginning of the experiment. The valuation was as follows: (Reads table showing consumption of feed by each lot and table valuation). You will notice that immediately after grain was added to the ration, the amount of corn silage consumed dropped. The lot of cattle receiving corn silage and cottonseed meal made heavier daily gains than any other cattle in there. (Reads table showing cost of feed for pork). This shows that wherever a large amount of silage is fed and is the principal feed, the animal utilizes it so that there is nothing thrown off that can be utilized by hogs. This shows that we have got to change our system of feeding.

I am personally convinced that the feeding of corn silage, supplemented by cotton seed meal is the system we have got to follow if we are going to make money. The complaint used to be that the packers objected to silage fed cattle. These cattle were valued by a commission man without knowing how they were fed, and he valued this lot here within 5 cents of the very best lot of cattle we had, and the packers brought them and regarded this lot as being worth within 5 cents of this lot here. These cattle, after they were hung up in the coolers, showed that this lot of cattle here were as firm, as white, as well finished, as any lot of cattle there. As a matter of fact, a beef man told me that he regarded this lot of cattle equal to any lot put in there, and yet they never received a mouthful of grain except the corn silage and cottonseed meal.

A Member: How much cottonseed meal was fed with the corn silage?

PROF. TOMHAVE: We plan to feed at the rate of $2\frac{1}{2}$ pounds per thousand pounds of live weight for the first 200 days, and then increase it to $3\frac{1}{2}$ pounds per thousand pounds of live weight during the last forty days, because the increase of an extra pounds seems to stimulate it and the animals will make better use of the silage they receive. (Reads table showing prices of feed). The only

change you might want to make is in the price of cotton seed meal. Our cotton seed meal was purchased last fall at \$3.50 a ton and we figured that it was only fair to use that figure in charging the prices for the feed, etc.

A Member: The price of silage, isn't that a little low?

PROF. TOMHAVE: I believe it is. I believe we ought to increase the charge for silage here, and yet a good many people feel that \$3.50 is a very good price for silage.

A Member: I think it is too low.

PROF. TOMHAVE: It may be too low, but even increasing the price of silage to \$4.00 a ton, our results would be extremely favorable, so far as the silage is concerned. There is no question about it; I believe that every man that is going to feed cattle in the State of Pennsylvania or any other, has got to put up a silo. He cannot afford to feed cattle without a corn silage, because his cattle will not make the gain without the succulent feed, the use of corn silage and cotton seed meal will stimulate digestion and give him a greater return than where the silage is lacking.

A Member: Would not the addition of some hay or corn stover to cottonseed silage improve the cattle?

PROF. TOMHAVE: I think so, I believe that if we had a little corn stover or straw, wheat straw or any other dry feed we care to put in there, it would have improved the condition of the cattle to a slight extent, giving them all the silage they could consume. The experiments in previous years show the use of a small amount of dry feed added to the rations is beneficial, that is, the cattle seem to relish or crave a small amount of dry feed of one kind or another.

A Member: How much cotton seed meal was fed with the corn silage?

PROF. TOMHAVE: We plan to feed at the rate of two and a half pounds per thousand pounds of live weight for the first two hundred days, then increase it to two and a half pounds of live weight during the last forty days, because the increase of an extra pound seems to stimulate it and the animals will make better use of the silage they receive. Now the price of feed we charge silage at \$3.50 a ton, etc. (Referring to the table showing prices of feed). The only change you might want to make is the price of cotton seed meal. Our cotton seed meal was purchased last fall at \$3.50 a ton and we figured that it was only fair to use that figure in charging the prices for the feed, etc.

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A Member: Wouldn't the addition of some hay or corn stover to cottonseed silage improve the cattle?

PROF. TOMHAVE: I think so. I believe that if we had had a little corn stover, oat straw, wheat straw or any other dry feed we cared to put in there, it would have improved the condition of the cattle to a slight extent given them all the silage they could consume. The experiment in previous years show that the use of a small amount of dry feed added to the rations is a good thing, that is the cattle seem to relish or crave a small amount of dry feed of one kind or another.

The CHAIRMAN: One minute before we adjourn. I see a gentleman standing back here and if he don't get a chance to say something, it will be bad for us on the trip. I want to introduce Bob Seeds for just two minutes, only two minutes. (Applause).

MR. SEEDS: Mr. Chairman, Ladies and Gentlemen: It didn't matter whether the Chairman called on me or not; I intended to talk anyhow. I am like the man in Pittsburgh who tumbled from the top of a tall building and fell all the way down and they gathered him up at the bottom very much bruised and dilapidated, and he had sprained his ankle and they were trying to fix him up and was sympathizing with him, when he said that it didn't make any difference, that he intended to come down anyhow. (Laughter). I know this is no time to make a speech. You all want to adjourn, but if you can give me a future date, I would like to take this platform and talk just for a short time, not on Community Breeding, but on Community Building.

I never knew such a time in the United States when everybody, from one end of the United States to the other, wanted to talk Community Building. They are at it everywhere and I have become very much interested in it, and I tried, in my own community, to carry out everything I have said along that line. I claim that it is just as much of an impossibility for a man to raise a razor back hog and wear a white collar as it is for a parafine dog to catch an asbestos cat going through hell. You have got to have things correspond. I heard of a man raising razor back hogs down South—did you ever see a razor back hog? If you have, you know you can't see him when he is going this way, he has got to go that way when you want to see him. Bill Nye and Col. Smith were on the platform at the same time down South and one day they were going

through the woods when along came a razor back hog and ran across the road, and after a while another ran across, and Bill Nye said to Col. Smith, "There goes the other half of that hog." (Laughter). Now that man that raises that razor back hog wears a slouch hat, he wears one suspender—and I know what I am talking about. I heard of a man down South who was raising razor back hogs and he sold them; he didn't come to Pennsylvania to buy registered stock, but he went to Ohio and bought registered hogs; he took them down South and every one had a peep; his neighbors came over to see those hogs; they leaned up against the fence and chewed tobacco and talked about them until they got that man that owned the hogs going, and it wasn't long until he pushed the side of his hat up, bought another suspender and got a little taller than his neighbors, and he went into town and got his hair cut, got shaved, took a bath, put on a white collar and when he came home his own dog bit him. (Laughter and applause).

Now that is what I call, not community breeding but community building; that's the way I look at it, and if you can give me to-morrow or some future time ten minutes—not now, because it is time to adjourn, but if you can give me ten minutes, I would like to talk to you and tell you how I look at Community Building and what I have been doing to back up everything I say. I like a man who does what he talks about, that is the kind of a man I like, and if you can give me a future date or a future hour during this convention, I would like to have ten minutes and I will ask you fellows to give me a future date; like the lady in Ohio, who was going through western Ohio, lecturing out there, and one night she wanted to prove to her audience how suddenly changes could take place, and to prove it, she said to the audience: "Why, to-night I may be in my husband's arms and to-morrow night, I may be in Abraham's arms." A fellow in the back part of the hall cried out, "Have you got a date for next Tuesday night?" (Laughter).

(The session then adjourned.)

POULTRY SESSION

May 24, 1916, 7.30 P. M.

Mr. J. H. Schultz in the Chair.

The CHAIRMAN: It is time we opened our exercises, and we will begin with a selection of music by Epler's Male Chorus.

The song entitled, "A Little Farm Well Tilled," was then rendered and received with applause.

The CHAIRMAN: Next we have a talk on the "Value of Free Range for Poultry," demonstrated by Mr. E. L. Phillips.

VALUE OF FREE RANGE FOR POULTRY

By E. L. PHILLIPS, *New Bethlehem, Pa., R. F. D. No. 2.*

Mr. Chairman, Ladies and Gentlemen: I had the pleasure of spending eight days in Berks county last spring, and was very much delighted with the meetings, and I must say that I am glad to come back to the county. I was so much impressed after having spent five days in Berks county that I could not help express myself to the people at that time, and I did say to the farmers and business men that I had found, in my opinion, some of the most wide-awake energetic farmers and business men in Berks county that I had ever found in any county in the State of Pennsylvania. I think that I can give you evidence why I would make such a statement.

This afternoon I was taken out to the Fair Grounds, which has been organized I believe within the last ninety-six days, and within the ninety-six days these farmers and business men in Berks county have spent \$94,000.00 in improvements and building, and I believe that it is the finest county fair in Pennsylvania; so they surely are wide-awake here, there is no question about it. And when I was asked sometime ago by the Department of Agriculture to speak at this convention, I thought I would enjoy speaking of some of the things that I felt were the most needful along our particular line, poultry, and that was the marketing of the poultry products.

Oh, I see room for such a wonderful improvement along this line, and it was thought that I would demonstrate that work, but I found after experimenting some along this line, being held up until this evening, leaving my home early Monday morning, that it would be absolutely impossible for me to demonstrate, so we have switched around a little bit and decided that we will illustrate the value of free range and the marketing of poultry products by illustration.

Now we have here on the screen, ladies and gentlemen, a picture that is not very attractive; indeed, it is a poultry house, one in my own county. This picture, and one other that will follow, are two that are not from our own plant, and the rest that we will have on the screen are from our own, because I have in mind to give you a practical talk, and while doing so, in talking of the things that we are dealing with over there at our plant, day in and day out, I think that I can do much better work.

Here is a poultry house. I say, in Clarion county, and it is one of the miserable failures of many in the State of Pennsylvania. It has an abundance of cracks and knot holes and a miserable roof; why, its an awful building, in my opinion, to attempt to keep fowls in. You see everything, almost everything except the floor of that poultry house. There was no lining in it, nothing other than what you see there, and for a floor in that building was a mud hole. After we have spent several thousand dollars in our attempt in raising poultry at Valley Farms, the gentleman who owned that poultry house came to me and said, "I have always understood and thought

that you were a keen, wide-awake business man; but you have made one attempt that there will be no returns from, because I have tried this poultry business for a number of years and there is absolutely and positively no money in it."

Now, ladies and gentlemen, I will drop the poultry house for the present and we will refer to it just a little later on. Here we have some of the colony houses which we use at Valley Farms, and they have given us very excellent results. I have recommended, in speaking to the farmers throughout the State of Pennsylvania, that these types of houses would be, in my opinion, very profitable for them to use, and many of them have accepted my advice and are using houses similar to these. There are great advantages to those who are keeping just a few fowls and get out on the range, the fowls get out where they have clean soil and all that kind of thing, and I would not build those buildings larger than twelve feet or twelve feet six inches in length and nine feet in width, not more than five feet high in the rear and seven feet to seven and a half high in the front. If you build them larger than that you will have trouble, possibly in hauling them from place to place, and that is the idea and the advantage of the colony houses. This picture is rather dim; it just happened to be in the bunch of slides that I have with me and I thought it might be interesting to those of you who are interested in commercial poultry work. This building is one of our winter laying houses; it is one hundred and sixty feet long. We have these buildings ranging from one hundred to one hundred sixty feet long, sixteen feet wide, five feet high at the rear and eight at the comb, and the comb is nearer the front than the rear and is six and a half feet high in front. We will see more of this building later, as we go along.

Now, friends, you wonder why that picture might appear on the screen there, but there are several lessons in it. One lesson is—that is the daughter of the gentleman who owned that miserable old poultry house, and that little girl at the age you see her there in the photograph, said to her father: "Father, I would have you go and consult some one who is making a success of poultry and I will guarantee you, if you will give me equipment sufficient to handle those fowls, that I will bring a return from them." Now I have had acquaintance with this little girl as you see her there on the ground. She is now a young lady, grown up, and she has had a love for the poultry business ever since she was quite a small girl, and I want to say to you, ladies and gentlemen, that I have found, for a positive fact, that is one of the very essential things if you are going to farm poultry. Do not farm poultry because of fadism or anything of that kind, but test yourself first of all and find out whether or not you are adapted for the work and whether you really have a love for the work, and then you will succeed. If you are simply going into the poultry business because some one has told you some fabulous story relative to the earning power of this work, you may make the mistake that many people have made in the past. This little girl is in love with the work and I found her just as you see her there in the photograph, and I said to her: "I would just like to have that picture because I have need of it." There you see her; she is visiting with her fowls, collecting the eggs. She is

working with those fowls all the while and she really and truly did show her father that there was quite an earning power from the poultry. It is one of the most profitable of all their undertakings on their farm at this present day, and she is controlling and she has the control of a very nice poultry plant consisting of about five hundred fowls.

Now, friends, we will study the chick for a little while. You know if we are going to make money from poultry, we will have to go in at the very beginning and we will have to surround these fowls with all the things that are conducive to their comfort and health, and if we do not, we are not going to succeed as we would. So now we have here on these platforms, while it is not very plain apparently, I don't know why, those fowls are two weeks of age and they are out there on those platforms and those platforms are on the easterly side of those buildings. I got a thought there by observing very closely some years ago. I noted that those little fellows simply had a great delight in getting out in the morning sun; they enjoyed it wonderfully, so we provide those platforms and those little fellows are out there on the easterly side of the building. They have access to those platforms as the sun is coming up. Then, on these platforms we provide nice, clean, coarse sand. Oh what a wallow and plat they have there, and they seem to enjoy it most wonderfully. That does not seem very much, yet I have found in working this out in a practical way at our plant, that it is very helpful indeed and prepares or helps prepare these little fowls for the free range they will have access to later on in a very short time after that is seen. Another thought relative to that is this; they have the play in the sand, they wallow in the sand and pick a grain of sand possibly, and after this play is over, then the sand and the accumulation from those fowls is all cleaned up and taken away.

Friends, I want to say that we must pay very close attention to the sanitary conditions in and around the outside of these poultry buildings, and it is wonderfully helpful, indeed, and if it is neglected, there is liable to be very serious loss because of the conditions not being as sanitary as they should be. At the age of four weeks, as I remember, when this picture was taken we have another lesson, studying these little coops. You note there the window and the awning board are up high and the reason why we have that picture is to emphasize the fact that we must not only pay attention to the outside of the buildings, as we noted in the last scene, but also the interior of the buildings, and, I might say, that many of the brooder houses in the State of Pennsylvania do not have the needed sunlight that should be in those buildings. At our plant, and we are keeping and raising thousands of fowls, we aim to have the sunlight getting into these buildings as much as we possibly can, and you will see at Valley Farms that nearly all the time during the day, when the sun is shining especially, you will note that we arrange to receive the sunshine and then we have the interior of those brooder houses flooded with good pure air, which is very essential and very conducive to the health of the fowl.

A Member: What is the elevation of that house that you have shown?

MR. PHILLIPS: The elevation of that house, the height in front is seven feet, I believe, if I remember right. Does that answer your question?

A Member: Yes, sir. There is no heat in that house, is there?

MR. PHILLIPS: No, sir, no heat in that house. They have been taken away from artificial heat. This picture here emphasizes something that, to the commercial people, will be of interest. In that building there you notice it is quite a large building and there are quite a number of fowls in there, and I remember when the picture was taken those fowls were eight weeks of age and we did brood in that building at the time that picture was taken, from chickhood up, between five and six thousand chicks; but I want to say to you, ladies and gentlemen, that that was quite an undertaking and I would not advise it in the hands of a novice by any means, or any one who is attempting to handle poultry in a commercial way, unless they are very well prepared for the work indeed; but my son, H. H. Phillips, took charge there, and, as you see, those fowls are eight weeks of age and but a very few of those little male birds, possibly half a dozen or thereabouts, but when the picture was taken there were around about thirty-five hundred to thirty-six hundred pullets; but, as I say, this is quite an undertaking, but it shows you what can be done if we are following our work carefully, and it is handled with all the care needed, care that must be bestowed upon this work. We succeeded very well in that, and it simply emphasizes that fact, that those things can be accomplished if the needed care is given. Now I said we would try and speak of some of the things that are very helpful relative to the free range for fowls.

Here we have a picture that you might think at first sight is a rather peculiar scene, and I have been asked frequently if those poultry houses there were placed in a field of stumps. No, not by any means. Those poultry houses are placed in a field that had a very nice start, vigorous growing sod clover and timothy, and here you will note what has been going on. We just sweep over a field, go right back over a field, keep moving back. Here we have been down in this region and see what has happened. This heavy sod has been trimmed down to the roots, so we just keep moving back as you note there. Now study carefully what is occurring and bringing this work out here in a practical way. Here we are going in another direction. Note here the same thing has been happening. As I said, we are sweeping in another direction and we go right over those fields with thousands of fowls, and, ladies and gentlemen, you would be astonished, those of you who have never had the opportunity to note the amount of such an improvement, such as nice tender grass and things of that kind, that they will consume if they have free access to it, and oh, how conducive it is to the health of the fowl.

Here is the thought in that picture that to my mind is very valuable; you know we poultry people have been studying for quite a long while and we have been writing and we have been lecturing on the construction of poultry houses to house the fowls in the Winter time. Oh we have spent so much thought and we have spent so much work along that line, and here in the back-ground, if you

will note—I should have called your attention to that fact before—but in each and every one of these views, you will note that we have an abundance of natural shade. Listen, friends, I have found that fowls will suffer as much or even more from the intense heat in the Summer time as they will from the severe cold in the Winter time, and I would admonish you at all times to furnish your fowls an abundance of natural shade, and I think as we go along with this illustrated work, that you will find at your farm, it is to your advantage, if you possibly can, to arrange to supply that shade.

Here we have two thousand pullets; the youngest in that picture is four months of age and the oldest is six months of age, and we are certainly trying to keep one thing at our plant that is very helpful, and if we do not have it, we surely will fail, and that is an abundance of constitutional vigor, and surrounding these fowls with what I have already called your attention to is very helpful in getting that vigor, and those fowls there, as you see them, surely show signs of vigor, but that is not the purpose for which I have that picture before you. You will notice the sunlight coming in over there shining in way back underneath the dropping boards. I said you would see more of these large buildings when we called your attention to the one in the second picture. This is the sunlight getting into the building. Here is how we get it in. One-fourth of the entire front of our buildings is open, or the upper half, as you see it in that picture there, and we have a muslin curtain down there in order that you may see the muslin curtain, but that muslin curtain has not given us the satisfaction it should have done, and in the last twelve months we have tried out an experiment so that we can now come to you and give you information along that line that you can bank on and that will appear in a later picture.

Now, friends, here is a scene that is something that we need to study; if we study the habits of these fowls, if we surround them with all the things that are conducive to health and vigor, etc., and then study carefully, we will learn many, many lessons by observation, and that is one of the greatest features in this wealth. You will note that those fowls are coming down those running boards pell mell; they are surely after something, there is something that is attracting their attention. Now the first thing that they have access to there is something that I want to make a plea for this evening for the fowls of Pennsylvania, and the first thing that those fowls have access to there is good, pure water. Good pure water is delivered to each and every one of those poultry plants at our farm, and I want to say to you, ladies and gentlemen, that I make a plea here this evening for good pure water just such as we are furnishing there, the very best we can get, perfectly safe for any home; that is the very kind of water that I would have you furnish to your fowls, and the reason why I put it so strong is because so many of the fowls of Pennsylvania have access to stagnant, filthy pools where there is nothing more or less than disease and death. They have access sometimes to the juices from the barnyard, from the pig pen, and things that are even worse yet that I will refrain from mentioning this evening, and I want to say to you friends, that my plea is that the fowls be kept away from those things, because sooner or later we will go to the market with the product of that

fowl, and if those fowls are going to have access to these filthy things, are we going to the market with that which we should take to feed the consuming world? Brother farmers, that is your job and my job, to feed the consuming world. I want to say to you that I have found this is something we need to give our most careful attention.

Not long since I was called upon to hold an investigation of some poultry meat that had been tainted from such sources, and we found that poultry meat absolutely and positively unfit for human food. We are so careful at our poultry plant and we have now had years of experience in handling thousands of fowls, I want to say that along this particular line we are so careful that even though a team is passing through those poultry parts and should happen to drop voidings, it is taken away, so that they do not have access to such things and do not acquire the habit.

Now here we have in the front of this building almost a plank over these buildings. There is a green growing crop. At Valley Farm we are not fencing particularly, we are not confining those fowls to anything particularly other than they must not go over on the neighbors land, so when we begin here, at the line between our farm and our neighbors, we begin and fence, come across, say, for instance to that poultry house there, from there to the next and from there around the cove; then we just swing those fowls back and forth and they have access to 150 acres on this side and 150 acres, or approximately so, on the other, and that is all the fencing we are doing; and after they have been over on this side consuming one of the crops I have called your attention to that is so needful in the rearing of those fowls, then in the next picture we open the fence and they have access to this crop. They dropped down in here so quickly that we didn't get very much, but you will see what happened later on.

A Member: Are the walls of those houses single board thickness?

MR. PHILLIPS: They are single boards lined with very good water-proofing felt inside. I have called your attention to the way in which we spread those colony houses out over the farm. I suppose in that view there is possibly 15 acres there and you see the fowls have access to the range, have access to the green crops and surely it is very essential to success. Now in the rear there we have the old orchard. That was an old, dilapidated orchard.

A Member: What is your green crop?

MR. PHILLIPS: Clover, alfalfa, oats, wheat, most anything that will grow, according to the season of the year. On this land we have grown as much as four and five crops as we will see a little later on, and they do the rest of the job. That orchard is an ideal place for those chicks. Distribute those buildings all around through the orchard and then have a nice green growing crop there and then the old orchard furnishes the needed shade and they furnish something for that old orchard that has been very beneficial to it, fertilizing the orchard and it is improving; it is not ideal yet,

but I want to say that it would be well if many of the farmers of the State of Pennsylvania would utilize their orchards for the growing of their fowls. It is very beneficial indeed, providing that orchard has a suitable exposure. We have on the top, at the knoll there, we have our breeding plant; it is absolutely and entirely separate from all the rest of our plant, and we are keeping there anywhere from 7,000 to 10,000 fowls.

Friends, you can get a thought there that I will say to you is very valuable indeed. Why have all those eggs? On these farms, even though you are keeping only a few fowls, why have them all fertile when the very egg that the consumer wants is just the opposite? Think of this lesson I am bringing before you if it is of value to you, and think carefully of those colony houses and what may be done even though you are only handling a few fowls. There is the land after the harvesters completed the harvesting of the crop, and it did not take them very long to do it. Thousands of fowls can trim a crop pretty quickly. They took in all they could with the camera, and I presume there might be 35 or 40 acres in that scene. This is all green growing crops through here and out here and along here is one of those large houses and so on around, and they do the harvesting and then are swung back, and so the work goes on. After the harvester then comes the plow. We must be very careful of the soil where we are keeping fowls as we are on this land, keeping thousands of them, and we have been in the work now for quite a number of years and the unexpected has never happened and we propose to try and keep it in that way. This soil then is all turned over. The plow has just finished the job here, even underneath the portion of the building that the fowls have access to; it is all turned over and that soil is all sweetened and the crop is grown and the work continued.

This is a picture that is possibly not as clear as I would have it, but I called our attention to the fact that we had some trouble with muslin curtains, and I think sometimes that we have expected the muslin curtain to do a little too much for us. Friends, we found this trouble in those buildings sometimes when we had the southerly storm and the southeasterly storm and the southwesterly storm, as we have over in the western part of the state, and I learned, after working the greater part of the winter in this part of the State, that you have them down here also. The trouble is sometimes the storm would beat through those muslin curtains and we would have moisture inside the building, and I absolutely will not have moisture inside of my poultry house, so we set about trying to prevent this, and then sometimes those buildings are closed down on these dark, dismal days and we have a change of temperature and there is where we must be on the job and everlastingly keeping after this thing, and here is what helped us out wonderfully and we have eliminated, to a great extent, the muslin curtains—a sort of baffle board in those windows. In the central part we have glass, and then a board sloping back as you see, and it gave us better light, better ventilation, considerably so, and we were not using the muslin curtain at all, and we absolutely and positively beat the storm, it had to stay out. This last winter was one of the hardest winters, I think, for the poultry men to handle things we have ever experienced, and such

extreme changes. Oh, it kept up very busy indeed, and you know we could control the temperature of those buildings much better with that arrangement than we ever could with the muslin curtain, and the beauty of it was that we did not need to use the muslin curtain nearly as much as we have used it before, so that is offered for your benefit also. We have given some thought to some of the things which in my mind are very helpful in producing fowls and surrounding them with the needed things I have mentioned.

Now we will drop that thought for a while and take up the other side of my text, and that is the marketing. After we have gone to all this expense and after we have gone to all this trouble etc., then we should have returns, and if we do not, we go to the wall, that is all. Then here we come in this scene with the marketing process and at our plant there is the little Welsh pony coming in with a load of eggs. On the wagon there we have 2,000 eggs that are collected at the plant, double-deck as you see there, and the little pony has drawn them to the packing house; that is his job and he is a very busy fellow in and around that poultry plant, attending to his particular work. He brings them over to the packing house there once, twice, three times daily, according to the weather conditions: once, twice, three times daily; not that, ladies and gentlemen, and those eggs are not allowed to be out there in the poultry house where they should not be, coming in contact with filth possibly, crooks having access to them and all that kind of thing, possibly starting to debase and ruin that excellent egg; so I say according to the heat of the season, they are brought over to the packing house as you see her. Our fowls are all one kind of fowl. We are keeping thousands of fowls and they are all one kind, and it is a mighty job to keep that one kind right and going as we would handle them, and having just the one kind of fowl, we have in the picture here three distinct grades of eggs. We have four, but the other grade does not appear here. But here, as to size and as to color, marketable eggs, we have three grades. Now while those fowls are all one kind of fowls, they are all supposed to lay a white egg. Some of them lay an egg just a little pinker than the other. Is it wise for us to properly prepare that which we have produced and gone to so much trouble and expense about or is it a proper thing for you and me to pack that and hand it over to the producer in a haphazard way?

And I want to say to you, friends, that everywhere I go, I find the farmer doing that very kind of thing, handing over his product in a more or less haphazard manner. Why we will never succeed, and I want to say to you, ladies and gentlemen, after having years of experience in sorting those eggs up, if we did not grade them up and use every thought relative to this work, we would never have succeeded in the marketing of those eggs as we have done; we would have fallen short, wonderfully and fearfully. Yes, as to size and color, etc., we have three grades of eggs. Then there is another grade there, the eggs that are possibly damaged, under-sized, too small to offer, on the market, they do not appear, neither do they appear when the customer sees the package.

After we have graded those eggs and packed them very carefully, we have given, as I have hinted, some very careful thought, and here I have an egg carton that I think possibly I can offer a few sugges-

tions that will be helpful in a general way. After the process as you have seen it on the screen, then we grade those eggs up and pack them in these boxes. Now here is a rather nice, neat, attractive package. I take pleasure in saying that I designed this box, because I am proud of it. There is a nice, neat attractive package made from good paper, and to improve upon the neatness of the package—understand our eggs are all white or nearly so as we can get them—the interior of that package is a nice tint of blue. Just imagine when that egg is graded up nicely and lays in that nice neat package, how attractive it is and how it brings out the beautiful white of the egg. Now I say that is neat and attractive; and ladies and gentlemen, I want to say to you that we have found for a positive fact that it pays to put these packages of eggs up in as neat and attractive a manner as is it possible for us to do it, and I believe that it will pay any farmer in the State of Pennsylvania or the United States, I care not what package he is producing and preparing for the market, it will pay him to bestow all the neatness upon that package that it is possible for him to, bestow upon it, and if he does such work as that, it will have a tendency to elevate him beyond his dreams.

Now we risk something more with this package; it pays to advertise, ladies and gentlemen. There are many farmers in the State of Pennsylvania who never think of advertising at all. There are positively many farmers in the State of Pennsylvania who never advertise, and we have found that it pays and pays very well indeed to advertise. Listen; this last spring I said to our druggist over there “the farmers will be needing the material to treat their oats for smut, there will be quite a demand for that.” I said to this druggist, “you have that material on hand, advertise and the farmers will know it and I imagine you will have quite a sale for the material.” He took the suggestion. Later on I saw that man. He said, “Phillips, it surely pays to advertise, because of the advertising of that material, we have sold jug full after jug full of that stuff; we have handled it until we are blame near stunk out of the store. It is wonderful what advertising will do.” I thought on that box I would have an advertisement on it, so on the side we have “Eggs from Valley Poultry Farms.” There is a mistake there that has cost us money. You all know at the present time because there has been so much said of us in the papers, etc., and this advertising, you know where we are and who is operating Valley Farms, but if it had not been for this extensive advertising you would not have known it.

I imagined some years ago when we selected that name that we possibly had the idea of something fancy in our minds, so we thought of that name, ladies and gentlemen. If I was naming that and had that advertising to do again—we have gone too far with this now, but if I had it to do over, it would be “Eggs from E. L. Phillips & Sons’ Poultry Farms.” On the top of the box I thought that customer would like some sort of a drawing card, and at the top, I said “We lay white eggs.” If he wanted to know what kind of an egg that was, he could read the next statement, “Produced by E. L. Phillips & Sons, New Bethlehem, Pa.; shipping point, Sligo, Pa.”

We have been doing the very best we could to fill that package with eggs, grading them up in the very best form possible for us to do. But I want to say to you that it has been a wonderful help to us indeed to use all this effort and we have been doing everything we possibly could to fill that egg carton with the very best the world can produce, and we have been chucking into that box all the honesty possible to crowd into it as far as we know, and I will say to you tonight that it has been the best investment of all the investments of hundred and even thousand of dollars we have ever spent—all the honesty we can crowd into it. Then, after that care is bestowed upon that package, for instance, the eggs are placed in this package today, the eggs produced today are brought into the packing house and this grading and sorting and packing is all completed and the egg produced today is loaded on the motor next morning and here I am myself with overalls and all that going out the next morning in the motor car with 210 dozen eggs; so we get on that motor car in the morning before breakfast—that is my job at home and I have made a great many trips this spring and I rush off to the station five miles distant so that we get the early express train which leaves the station at 6.30 in the morning and the consumer has that egg on his table tomorrow for lunch, and he has been saying to us, "E. L. Phillips & Sons, come right on with that egg, we are mightily interested;" and today, ladies and gentlemen, the demand comes from three states and they are keeping us going some and we have found that that is a pretty good system in getting it in that way. If you have any to beat it, come right along, because we need your help.

But there is a draw-back to all this; we always have our troubles, and here it comes. Now, ladies and gentlemen, there is E. L. Phillips and one of his sons and two of our teams out on the road, and you wonder how that comes in in the marketing of poultry products. I will tell you how it comes in; it comes in very well indeed. This road here, as you see it—this picture was taken the 5th of April this year, and that road was in pretty good condition at that time; we had just started out there to drag it. I wanted you to see the condition of the road before we had a drag on it at all. The frost over in the western part of the State had gone out the latter part of March. By the 5th of April we had the road in very fair condition. That road, ladies and gentlemen, has been dragged up to this present time by E. L. Phillips & Sons seven times. We have been so interested in this matter because of things that follow, that we have been dragging the road for eleven years, free of cost. We have received in the eleven years only \$2.35; and this road that we have kept in condition, is a tough sort of clay, very muddy indeed. A gentleman said to me, one of my neighbors, who used to be opposed to a road drag, "Nothing but a fool would use a road drag;" but he said to me this spring "E. L., if all the roads in the country had been dragged as that road has been, it would have been a wonder and help the farmers a whole lot." Said he, "That road would, during April, have served the purpose of driving an automobile fully 60% to 75% of the time," and we have had an awful wet muddy season over there this last April and May.

We have been dragging that road simply because we are much interested, because we need that road so badly. But then, as I said, there is a drawback to it, you know, when we come to line there, that road has been dragged once and once only since the season of 1915 until May 1st, 1916; and I said to that supervisor, "Oh please drag the road, I will pay you for it." That was over in the next township; I said, "I will pay you for it, go ahead and drag the road." I got him to drag that road once, and it is a main thoroughfare. He said, "It's no use, it's all tomfoolery." We had a road talk last night. He said, "It's all tomfoolery, there is no use in dragging that road, it is all foolishness;" but I persuaded him to drag it once, and that Ford car, loaded up with 210 dozen eggs, went over that road within an hour after he had dragged it, and he was standing by the road and he looked and wondered why the road was in a fearful condition in the morning and within an hour and a half's time, that motor car returned and was going through with a load of eggs again to the station, and he was working alongside of the road and I said, "Come on, hurrah, jump on;" and he made a dive and I slowed down and he jumped on that car and he went over the road. He said, "I didn't think you could get through." I said, "We are going through anyhow," and he said, "Blamed if we will," and I took that fellow on to the station, but that has been the last of that dragging and it has been a wonderful hindrance to us in getting our eggs to the market.

In the next township there is a very wideawake, alert man there, a farmer; he is one of those fellows that is doing things, and he said to those farmers, "Gentlemen, I am going to start my saw mill tomorrow morning and I am going to saw out material and give you material sufficient to make and I will pay for the making of 25 drags that I am going to give you, and all I ask you to do is to drag the roads occasionally after a rain," and I'll be blamed if those farmers haven't turned that down.

Ladies and gentlemen, I want to say to you there are two things the farmer needs today: The one thing he needs and needs badly is to crowd within himself all the business ability that it is possible for him to crowd, in order that he may produce, as best he possibly, can, and prepare his product for the market and hand it over to the consuming world in the best possible shape. But I believe today that the thing most needful to the farmer of anything I know of in helping him out in the marketing of his product whatever it may be, is good roads. I have kept that road in such shape that it could be used from January to January by a motor car, twelve months in the year, and that road, ladies and gentlemen, is a mighty help in time of need. But the thing we need is good roads, good permanent roads, and we should get them as fast as we possibly can, and next time we have an opportunity to get them, my suggestion to you is to let us get them. I thank you for your attention. (Applause).

The CHAIRMAN: This was a very interesting and instructive talk. I feel sure that in these meetings we make a great mistake, we have too much of one kind of food here, we don't have enough variety.

I think we ought to have more music like we had a little while ago, and if the gentlemen are here yet, I would like to call on them to give us some more before we start in on the next subject—give us the same songs over. (Applause).

(The music was rendered and received with applause).

The CHAIRMAN: I want to announce that tomorrow forenoon, immediately after we adjourn the morning session, the photographer wants to take a picture of us good-looking people; and he gave particular instructions that the ladies should accompany the gentlemen out in front of the hotel where he is going to take a picture of the Board and their friends, and he gave particular instruction to bring the ladies. So, gentlemen, you know what is required, immediately after the morning session. After we are through with our regular program for tonight, we will have a talk on the suffering people of Belgium; don't forget that; I don't want you to leave the Hall till we close, we will hold you here until possibly 12 o'clock. (Laughter). Next we will hear from Prof. H. R. Lewis, of the Department of Poultry Husbandry, New Jersey Experiment Station, New Brunswick, N. J., on the subject of "Modern Farm Poultry Management."

Mr Lewis spoke as follows:

MODERN FARM POULTRY MANAGEMENT

By PROF. H. R. LEWIS, *Department of Poultry Husbandry, New Jersey Experiment Station, New Brunswick, N. J.*

Mr. Chairman and Members of the Pennsylvania State Board of Agriculture: It is always a pleasure to get back and meet you people, not only because I meet a lot of old friends, but also because I run into a lot of people who are mighty keen and mighty well interested in the poultry business. You people appreciate as well as I do that times are changing, and the poultry business now is entirely different from what it was five or ten years ago. If we are going to make a go out of it today, we have got to look at it from an entirely different aspect, got to look at it as a business, maybe a part of a larger business, but we have got to look at it as a business, and there is no time in the history of the world that business has been looked at in the detail way that it is today. The manufacturer or the merchant divides up his business into a great many different groups and he has it all down to almost mathematical precision and he pays a large amount of money to expert accountants to tell him at any time just what the different parts of his business are doing. And so it is in poultry work, it is coming more and more to that status where we have got to know just what we are doing in every line of the work if we are going to make the most out of it.

Now, as I said, the poultry business from the farmer's standpoint, he has got to consider three definite phases in their broadest aspect: First, those problems which have to do with production, and many of them have been ably and forcefully pointed out by Mr.

Phillips from his own practical experience in operating that large commercial plant; and, secondly, he has got to concern himself more and more with the details of distribution. The middleman takes too much, possibly, of the consumer's dollar; 45 cents out of every dollar that is received or rather that is paid by the consumer for the eggs comes back to the farmer; the rest of it is used in distribution and so we have got to make that one problem to study, and the third problem has to do with them all, and it is really the business side of it; it is the consolidated grouping of all lines of that business together for the maximum amount of efficiency, producing, if we want to, as many different kinds of products as that poultry farm will produce, marketing everything marketable at the most economical time, keeping records so we will know where we are at and considering the whole problem of our work from a business standpoint.

Now, then, with the use of the slides, if we can have the lights out, I am going to try, and rather hastily, but in some detail in certain special points, go over some of these things which I briefly mentioned, those things which are more or less common knowledge to us I will just mention in passing; those things which, in the last year especially, we have found out and come to appreciate more and more, I shall spend more time upon.

First, problems of production. The manufacturer or the farmer or the poultryman is primarily one who makes goods to sell, and obviously we have got to have the goods to sell before we can consider problems of selling. So production is fundamental, and the poultry farmer, if he is going to produce the maximum product at a profit, he has got to consider that above everything else; he has got to be a farmer and a producer first. Now, then, the poultry farmer is concerned from the standpoint of production in maintaining a healthy, vigorous flock, free from disease, in an environment which is conducive to the best production, and hence he has got to provide those birds with suitable houses, fresh air, plenty of sunlight, dryness and plenty of room. Those things have got to be present if that flock is going to produce its best, if it is going to pay any kind of a profit on the labor and the money invested in the enterprise; and how many times we go around New Jersey, and I suppose you people here in Pennsylvania see men trying to do it without paying any attention to that problem, just as the first picture which Mr. Phillips threw on the screen, so ably pointed out.

Here is a picture which shows a house, not as crude as the one shown earlier, yet shows a faulty construction, solid glass sash, no adequate means of ventilation—a refrigerator in cold weather and a hot box in hot weather. That problem of housing and providing those conditions has been largely solved by means of so-called fresh air houses which the next picture, I believe, will show, houses which have muslin fronts, possibly, some glass, and even in some of our South Jersey sections around Vineland, no muslin at all is used, but a heavy projecting drip, so-called, is put out over the front of the building two or three feet to keep driving storms out, and the birds are kept under those conditions there where they could not be, possibly, in your own State of Pennsylvania. Fresh air, plenty of sunlight and absolute dryness are the three fundamentals of that poultry house.

I want to take just a minute to go over one or two details of this little house you see here. For a long time past, some three years, the New Jersey Experiment Station has been trying to work out a standard poultry house. We know that in some places and under certain conditions, the exact type of house will vary some; but we wanted to get it as near standard as possible and hence we worked out this multiple-unit idea. You see here this shows a double section, (the house is 40 feet long); this is half a section, coming from here over to the center, 20 feet, and it is 20 feet deep, 400 square feet, with a capacity of 100 birds. It is built on a uniform basis. The farmer keeping 100 birds can build one unit; if he desires to increase to 200 or 300 or 500, he can increase in the same proportion. There are a number of features about that house which will interest you, I am sure. First, one or two details about the plan, the shed roof construction; the most economical to build, 16 to 20 feet in depth; our plans call for 20; it gets the birds back away from the wind and exposure; it is 8 or $8\frac{1}{2}$ feet high in front and 5 feet high in the back, and there are hundreds and hundreds of these houses, ranging in length from 20 to 25 feet in New Jersey, and we have yet to hear a kick or complaint if they are constructed properly.

One or two details which are of special interest at this time, and that is the question of maintaining dryness, the question of maintaining rat-proof conditions in the house, the question of maintaining permanence and ease of cleaning—that has to do with the details, the foundation of floor construction. These houses on Mr. Phillips' plant are elevated. There may be certain conditions which make that desirable in certain locations and on certain farms; for our soils in New Jersey and our locations there and we believe in the majority of cases, the best results are secured with the least expenditure of money by putting the house on the ground, on a good concrete foundation, putting inside of that foundation a foot or 10 or 12 inches of cinders, and over that a coat of concrete which is float-finished. That foundation with us is by far the best, both from the standpoint of cost and efficiency. The labor of cleaning and the sanitary feature is of special importance in that type. Then a thing which I believe could well be put into every poultry house, is a small opening in the back, some such construction as you see here, for use in June, July, August and September, when it is exceptionally hot and we want to do everything we can to cool that house off and make it congenial as possible to the birds. It can be put in when the house is built or put into old houses. By actual temperature test, the use of those ventilators in the back has cooled houses down at least 11 degrees below similar houses that did not have these ventilators open. And then the cost of this unit construction will interest us, especially this figure here, the cost per bird, which is really the basis for figuring the cost per house, allowing four square feet; that is the cost for material, 88 cents a bird, and adding to that the cost of labor, whatever it may be; and I don't like to specify the exact cost of labor because it varies, but assuming it is one-fourth the cost of material, that brings the cost per bird up to a little over a dollar. I simply bring out this point of uniform conditions, so-

called standard unit houses, which will create an environment, which will keep the flock happy and contented and healthful, as one of the fundamental problems of the producer.

Now the second problem, as I see it, which confronts the producer, is that of providing for his flock food material in sufficient amounts and economical and of the right character so that he can maintain that egg production which he must have if he is going to make a profit from the venture. In order for him to intelligently feed those birds, he has got to have his mind pretty well made up as to the reason for which he supplies certain definite feeds, and that would naturally call our attention to the nature of the product for which we are feeding. In feeding a laying hen, we have got to maintain the organism, the body, build up the waste which is going on. The bird's body, as you see there, contains over 50% of water, over 20% of protein or nitrogenous material, lean meat, etc., and then the egg, which is the direct product we are after, is two-thirds water and over 13% protein; or, as you will see by looking at that, about a third of the dry matter of an egg is protein compounds or nitrogenous material. If there is a relation between the type of food we must feed and the character of product which we are after, which there is, it is obvious that we have got to feed that laying flock, if we are going to get a maximum of egg production from them, a large amount of water and also considerable protein or nitrogenous food material in addition to a certain amount of ash and carbohydrates and fat, the latter two being used quite largely as energy formers, heat producers, they make the heat which keeps the bird's body warm and generates the energy which enables the bird to move around.

Just how shall these ingredients be supplied? I do not believe we can do it in any better way than keeping before the birds all the time, in large, self-feeding hoppers, some good standard dry mash. There are dozens of good commercial mashes on the market. Many of you can go to the grain store and buy ground grains and mix up a good mash. We in Jersey use this: I don't know that it is the best, but it has been giving us excellent results for a number of years, and that is really the test of a poultry ration. We are going to use this mash just as you see it in our egg-laying contest at Vineland. Variety, palatability, economy; the prices you see here are not those prevailing at this particular time, but it is impossible to make a new slide each time, so they will have to be taken subject to price variation. Meat perhaps is used as the source of animal protein, 20% of the dry mash being from that particular source. This material is put in large hoppers, such as you see here, placed in the poultry houses, built right into the building, none of these small, metal hoppers, which are costly, require a good deal of attention to take care of them and waste food. We can build a hopper of this type, get no wastage, get a large feeding surface and have it so fixed that the birds themselves can determine and balance their own rations, because they can do it better than we can, and then we supplement that dry mash with a good scratch grain ration, feeding it morning and night, in enough litter to compel the exercise so fundamental to health and production. With us, we split the grain ration in two, and feed the wheat and oats in the morning, because we do

not believe the birds need the large corn diet at that time, feeding only relatively small amounts in the morning. The primary object of that early morning feed is exercise. At night we feed a more varied ration, containing the cracked corn and buckwheat or carbohydrates, heating feed, which keeps up the body temperature at night, which is in large part kept up in the daytime by activity and exercise which the bird is induced to make.

Simplicity in the poultry ration is a big advantage; do not make it too complicated; a good dry mash, some variety and a good scratch grain ration intelligently fed will make any birds produce a goodly number of eggs. A little feature which has recently been promoted extensively but which by some few, has been known and appreciated for sometime, is the value of skim milk in feeding poultry. Those who raise chickens in large numbers know the great value of sour skim milk in feeding young chicks, and we at the station at New Brunswick have been running a number of experiments in feeding our skim milk to laying hens, and we found it a very profitable practice, buying it in 40 quart cans and feeding in pans under the front of the houses just as we would water, having the pan fixed so that the birds can not get in it, and being careful to rinse the pan out carefully between each feeding.

A record of a flock of birds which were fed skim milk and a flock which were not might interest you. This shows a rather greater difference than we find in the majority of cases, but it is an absolute record of two pens of a 100 birds each; the pen on the left, No. 25, laying during the year, 8383 eggs, and the pen on the right, which received skim milk in addition to the uniform ration, laid 12,000 eggs; and coming down to the profit in the above feed, we say that pen No. 25 or the no skim milk pen, paid \$156.93 profit, or about \$1.50 a bird, and pen No. 22 a profit of \$248.63, or a profit of \$2.50 a bird, or a difference primarily due to the introduction of the sour skim milk kept before the birds all the time, of very nearly a dollar a bird.

A Member: After you take out the mortality and the cost of labor, how is that affected?

PROF. LEWIS: The mortality is by far less in the skim milk pen and there is very little difference in the labor. This is not a mash, just sour skim milk in a pan. We kept water there just the same, but the way those birds drink that sour skim milk—they drink it ravenously. Sour skim milk in our estimation is far superior to sweet milk. In the first place, it is easier to feed because the milk is going to sour anyway; in the second place, the presence of the lactic acid, which is only present in the sour milk, seems to act as an internal disinfectant or stimulant, cleaning the digestive system and keeping the birds physically fit. Again, sour skim milk is probably five or ten times more palatable than ordinary sweet skim milk. Experiments at a number of stations in Maine, Connecticut, Rhode Island and in our own work and some at Cornell, show very material advantages for the feeding of the sour product, that is thick, clabbed skim milk. These figures can be taken for what they are worth, and I might say that in a number of other experiments, if balanced up with this, would show an average profit per bird where skim milk

was fed, an increased profit of about 60 cents. This particular one showed the highest of any comparison we had. We cut the meat down slightly where we feed skim milk. In this particular pen, we did not, they all had 20% of meat; our idea was to keep everything the same in both pens and just add to it the sour milk in one case. If I were feeding a commercial flock sour skim milk, I should cut the meat scrap down to 20% right off.

A Member: How often do you scald your milk dish?

PROF. LEWIS: Once a week, sometimes twice a week. We rinse them out with clean water daily before the new supply is put in.

Now we come to another point, using every possible effort to provide that high water content so necessary in the bird's body and the egg. We can do that during the summer by running the flocks over green grass ranges and the use of crops as Mr. Phillips discussed, and here you see a flock of pullets feeding on alfalfa, an ideal type of succulent feed, palatable, containing a large amount of protein and having a high water content. Those of us who keep large numbers of layers, even the farmer who keeps 50 or 100 fowls, must, if he is going to get the best results of that flock, plan for some source of succulents for winter use, and I do not believe there is anything which will beat a mangel beet. You can get a large yield per acre, the birds relish them and it is a practice on the better managed plants to use that type of succulent. Where we find ourselves without beets and cannot buy them, we can go to grain sprouts from grain, oats being superior. Oats are certainly better than no succulent at all. The feeding problem would not be complete without saying a word about water content, the need of having for them at all times an abundant supply of water.

A Member: Would it be possible or liable to happen that each of the feeds of the composition will be put in separately and let the hen eat that if she wants it?

PROF. LEWIS: We have done some work along that line, putting in 30 hoppers in which we had 30 different kinds of feed, oats, wheat, barley, buckwheat, etc., and allowed the birds to choose the particular ingredients they wanted. I cannot remember exactly all of them, but it has been published in a number of feeding journals and I was very much interested in it. I remember that wheat lead, corn came next, oats next, barley next and the rest I cannot remember exactly, but the whole grains lead with wheat by far the preferable grain the birds would consume if given unrestricted ability to select from among a number.

A Member: What was the laying result?

PROF. LEWIS: They laid well. We did not do it to test production, but more to find out the natural inclination of the flock to select and what they would select. They laid very well, but there was no comparison between the pens that had their rations put in in their entirety. Leaving the feeding problem and coming to the vital pro-

blem of production that has to do with the importance of looking ahead, the importance of being sure that plans are laid so that five years hence the flock will be better than it is today; continuous improvement in the future generations can only be brought about through breeding, therefore everyone of us, whether we keep a few birds or a lot, ought to have a small parcel of land or a number of houses such as you saw in the previous picture, set aside from the regular poultry block in which special matings can be made for propagation or breeding purposes, picking out selected individuals, characterized by some special, desirable feature, and breeding from those special pens and not mating up large flocks that we do not need for hatching eggs; putting into that pen or putting into a few of those pens, the trap-nest.

A trap-nest will give a man a wonderful amount of information. The farmer with a few birds possibly cannot afford to use it and will have to use visual characteristics and his own knowledge of birds and their appearance to make his selection, but the man who is in it commercially, who is going to stay in it, is coming to the time when he has got to use a trap-nest more and more, just as the dairyman came to the time when he had to use the milk scales and the Babcock test. And then we come to the time when that trap-nest shows us wonderful results and enables us to pick out the hens that are good producers, and if carried through a number of generations, it enables us to tell the hens which were the mothers of high producing pullets and the mothers of cockerels which themselves were the sires of high producing pullets; in other words, progeny testing is the thing the poultry man is coming to very rapidly. The fact that the ability of a bird to breed is going to be measured by the characteristics found in her progeny.

Here is a hen which is familiar to a good many Pennsylvania people, a New Jersey bred bird; in one of the recent egg-laying contests, a Columbian-Plymouth Rock, which laid 286 eggs. What a short amount of time during the year that hen was loafing. When we get hens that lay up into the 200 egg zone, we have got phenomenal individuals which, if they possess vigor, stamina and vitality, ought to be bred from, and so I want to emphasize that point of breeding to increase the quality in future generations. I will give you a little history in that connection; a hen which possibly I have shown before, which laid 246 eggs in her pullet year and continued to lay heavily from that time to the present and which has longevity and vigor and stamina and which has been the foundation of a line of heavy producing birds, the highest one of which has laid 297 eggs, and many of them coming around the same zone which this particular bird here occupies.

And how was that line of heavy producing birds established? It was by selecting cockerels from this hen, breeding them back to their mother and to other high producing hens; that is the point. The male bird to the poultry breeder is worthy of far more consideration than we often give him. We often kill them off after they have been used for breeding one year, without any knowledge or effort on our part to determine whether the daughters from those particular males were good or bad. If we can find a male bird that invariably produces high fecundity pullets, he is of inestimable value to keep for a number of years, and vice versa.

A little story might illustrate: We bought a cockerel from a large exhibition plant in New Jersey a few years ago, number 91. Three years after we bought him, I had occasion to look over a number of high-pedigree performances and found a lot of hens which were low performance, and some of these hens or pullets were out of some of our heaviest producing birds of an older generation, and when I came to trace those back, we found there had never been a daughter from that male bird number 91, which had laid over 90 eggs in a year. He was an excellent bird for carriage but he simply did not possess the power of fecundity, and if we are going to produce eggs commercially, we have got to breed for them as well as feed for them. But we do not want to lose sight of the fact that the inherent vigor of the stock is worthy of as much consideration as anything else, because, unless we have that inherited vigor and vitality, the bird cannot develop these other traits to the fullest degree, so we do not want to breed a bird of this type, no matter what history he may have for wind, and we'd rather take a bird that was not quite such a pattern but which had characteristics of vigor and vitality, a high tail and a deep body, thick through in all parts, sprightly and not the drooping and emaciated type which you saw in the previous picture. That same condition is carried through its progeny which comes from these birds, if they are bred from the four chicks over in the left-hand corner, all of the same age, and some in the upper right-hand corner, all of the same age. I had occasion to go down to one of our colony brooder houses the other day in which there were 200 Barred Plymouth Rock chicks. There were twenty birds under sized, small, 6 weeks old, feathered slowly, and the differences were due almost entirely to inherited traits, so we want to select and cull for vigor and vitality with the idea of breeding for these character. We do not want to stop culling with the breeding pen; we want to keep right on in the case of the youngsters through the growing period, weeding out birds which look like that stilty Barred Plymouth Rock cockerel in the lower picture and like the knock-kneed Rhode Island Red in the upper one. It is just a question of taking the time and putting them into practice—the traits we all know.

Coming to another point in production, that is the question of propagation, the hatching work, the farmer with only a few eggs uses the hen. A great many farmers we visit in New Jersey I know get very poor results with the hen, simply because they do not take any pains with her, do not see that she is kept free from lice and do not give her a good nest; they think she can lay and hatch eggs under any circumstances, but that is not so. Poultry management means careful attention. The commercial man or even the farmer using an incubator has come to appreciate that if he is going to get good hatches he has got to take care of that machine and keep it in good sanitary condition, keep it clean and working properly. We cannot let this poultry business go in a slipshod way, we cannot carry on that practice very long before it is going to have us down and out.

In hatching work there is one thing I want to especially bring out, and that is this question of early hatching. I will give you a few figures which will interest you. For some time we have been discussing and advocating relatively early hatching; we appreciate the fact that Leghorn, is hatched in April, probably in the majority of loca-

tions, will come into egg production about the right time in the fall so that she will lay fairly well in the winter. If hatched too late, she will not mature early enough; if hatched too early, she will go into a moult. There is a time in the poultry man's calendar during the months of August, September, October and early November, during which time the older hens are moulting and very few eggs are consequently being laid by them. That is also just previous to the time when the normal spring hatched pullets come into maturity, and hence we are not getting many eggs from them. It is the slack time of the year as regards the egg basket.

At the New Jersey Experiment Station, in co-operation with some ten farmers of the state, we have been trying the question of bringing out a small percentage of the pullets relatively early, if you are hatching to get sires for seven hundred pullets, bring out a couple of hundred in February. Just let me give you a few figures showing the results of a flock of February hatched birds. Two hundred hens in this instance laid during the year 26,000 eggs, starting August 1st. It is true they went into a moult in December and did not lay very much during December and January, but they laid a remarkable production in September and October and early November and made a good big profit during those four months. There is one misprint here: this profit average profit per bird should be \$2.22. That is above feed. Labor is not deducted nor is interest deducted. The average production per bird was only 138 eggs, but just see what you received for eggs during the months, for example, of August, September, October and November.

Now what are some of the advantages of February hatching? Eggs in the fall, when the yearlings are moulting, fall eggs bring high prices. February pullets make good breeders the following spring; February cockerels make the best breeders; they have time to mature; the surplus cockerels which are produced bring high prices as broilers; they go on the market before the slump in the broiler trade is reached. The chicks make excellent growth in the summer, and there are innumerable advantages which come to us by putting into practice the bringing off of some early birds.

A Member: Is there any advantage in June hatches?

PROF. LEWIS: I do not think so, in general, for this reason, that they come out during the summer and must be bred during very hot, dry weather, and it is our experience that June hatched birds grow slower, mature at smaller size and do not make the efficient individuals that the April or May or earlier chicks do. If you have got a special trade or a particular condition, it may be an advantage.

One or two words about breeding, which is a problem of production. The time was, not so many years ago, when we used to have to fool and fuss with a little equipment of this kind. They are obsolete, out of date, not useful; they do not give us the greatest efficiency. Then there was the time when we all believed in the long pipe brook house, and some of us are using modifications of that today, this being an equipment in which the heat is supplied in pipes underneath the cupboard, but recent developments have brought about a type of equip-

ment much more satisfactory, and that is the coal burning brooder stove. The coal burning brooder stove in our own state has been responsible for brooding successfully in New Jersey this year the largest percentage of chicks the state has ever known. You rarely see a flock of any size in New Jersey in which the chicks are not being brooded in the colony stove. This shows a type we find very popular; no curtain, all deflected heat from near the stove to the outer walls of the building; there is a uniform variation in temperature from very hot to cool; the chicks can find the temperature themselves which meets their own body requirements. These stoves are located in buildings somewhat of this type that you see here. The labor item is cut down to a minimum and large flocks are handled, 300 to 500, rarely over 500, successfully. I believe it is going to revolutionize the poultry business in so far as the brooding work is concerned.

One point in the production end, as far as breeding is concerned, and that is the great value of bone in the chick ration. I published a circular a short time ago giving some explicit figures dealing with that problem. I simply show here some sources of bone, dry granulated bone you can get for about \$2.00 a hundred; then the fish scrap, if you can get it, is an excellent supply of bone, and of course there is more or less bone in high grade meat scrap.

A Member: Is there much danger in feeding bone to chicks?

PROF. LEWIS: A good, dry granulated bone, not fertilizer bone, which has been treated, but a good dry granulated bone which you can purchase as feed bone, I see no danger at all in feeding it. Fertilizer bone, a great deal I imagine is acid treated, at least we find that to be the case, so we specify, whenever we buy bone, that it shall be a feed bone, specially prepared for feeding purposes; that is manufactured in much the same way as meat scrap is prepared, rendered and cooked in caldrons and the fat taken out under pressure and at a high temperature. I believe in it strongly. There is 25% of protein and 23% of phosphoric acid in this dry granulated bone which you can get for about \$2.00 a hundred.

A Member: How about green bone?

PROF. LEWIS: I would hesitate to recommend that. The labor involved, the questionable quality, the fact that you can get your birds off condition, are all things which in my mind generally tend to discountenance it. But there are men who have relatively small flocks who use it as a constant source of supply and find it successful.

A Member: Do you feed small chicks potatoes?

PROF. LEWIS: No, we feed no potatoes at all in our work, because we do not have them. Personally, I think that potatoes have to be fed with a good deal of care; they are rather starchy, and a bird gets a good deal of carbohydrate material anyway, and I'd rather feed beets than potatoes, which are of a more sugary nature. In

this production end, every poultry farm is vitally interested in getting first full maximum number of those pullets, birds which can go into the laying houses, to replace the older ones which have passed their usefulness for egg production.

I will just show you a few pictures which will cover the ground Mr. Phillips went over in that connection, namely the value of free range. The commercial man, putting his birds in the orchard on extensive areas, growing a rotation of green crops for them and providing shade and plenty of water for them to drink, and in the small flocks there is many a cozy nook in some field or pasture where there is a running stream, where colony houses can be located, no fences, and where the birds can run under natural conditions. In New Jersey we have to contend and fight continually the practice in our suburban communities of growing chicks in confinement in back yards. Then, cutting the labor down on the range by feeding in the hoppers, making it as mechanical as you possibly can, in addition to the economical supply of a constant amount and abundance of water, shade, green feed, plenty of water to drink and the plan of having a range over which they may run, will complete the producing problems of the poultryman in that it will enable him to have in the fall an abundant supply of good, vigorous, husky pullets without which, no matter how careful he is in feeding them or caring for them, if he does not have that foundation to start with, he will not succeed in making a cent out of the business.

I am informed that the time is up and I want to say, in conclusion, two things: The selling problems, which were the second group which I mentioned, that is the problems of distribution, were covered by Mr. Phillips, and everything which he said I put a heavy O. K. to; more attention to detail, more attention to a neat, attractive package and a uniform product as regards quality are the things we have got to come to.

I want to make two announcements: one is regarding our egg laying contest at Vineland. Any of you people interested in something new along that line, address me a postal card at New Brunswick and I will be glad to send you all the information I can. We are putting on a three year contest, which is not only in egg laying but in poultry breeding as well; ten pullets the first year, kept the second year pedigreed for two years; we breed from them the second year and the third year put their daughters back into the pens, so it is really progeny testing and we believe it will give us a great mass of information and is a great step in advance of any contest of that kind ever yet run.

I want to comment favorably on one thing. I have heard a great deal of since I have been here, and that is your rooster week, the fact that Pennsylvania has come out for the production of infertile eggs at all times except the breeding season, and that sets a time at which the farmers and poultrymen can separate the breeding males and, if useful, put them in a pen by themselves, and if not, market them, and then produce, all the rest of the year, an infertile egg which is materially superior for market purpose.

After the rendering of more music, the session adjourned.

May 25, 1916: 9.30 A. M.

Hon. Chas. E. Carothers, Chairman.

The Chairman: We will now come to order. I took the privilege of jotting down what I wish to say to you this morning, fearing that I might neglect something that I wanted to say; and on the other hand, might say something that I did not want to go on record as having said as your presiding officer. I have no apologies to make, however, on this account.

Mr. Carothers delivered the address as follows:

ADDRESS

By HON. C. E. CAROTHERS, *Director of Institutes.*

We have come to one of the most important sessions of this Normal Institute, for the reason, first, that we are going to review to a certain extent the work of the last season and discuss for a short time the work for the coming year.

Many of those now present have no doubt been regular in their attendance at these so called "Round-ups" for many years. While I have attended quite a few Farmers' Institutes held under the auspices of the Agricultural Department of the State, this, as you know, is the first that I have attended as your Deputy Secretary and Director of Institutes. Your former Deputy and Director, Mr. Martin, whom we are glad to have with us at this time, devoted a great deal of time, hard labor and attention to this work, and when I entered upon my duties this year in the midst of the Institute season I found the work well in hand and the Department surrounded with a corps of able and efficient instructors, men, in my judgment, well qualified by experience and practical knowledge to discuss the subjects with which they had to do. From my short acquaintance with them, my first thought is that it may be hard to improve on them; yet it shall be our purpose if possible to bring our Institutes to an even higher standard of usefulness to the farmers of this great State.

I am sorry that I do not have a more extended and personal acquaintance with the Chairmen of the different counties of the State, and on whom so much depends as to the success or failure of our Institute work in their respective counties. I will say to the Chairmen here that I care not what your affiliations might be or your politics are, nor what your religious creed may be, we shall expect of you, honest, energetic and efficient service in promoting the up-building of the Institutes in your immediate locality. Each member of the State Board who acts as Chairman are chosen by the Agri-

cultural Society or different Fair Associations, I presume are selected, at least, I hope so, on account of your interest in agriculture and the uplift along this line in your communities. In accepting this position and by virtue of which you are now here, you signified your willingness to engage in this work and to do all in your power to create sentiment, to work up a good attendance and an increased interest in the Institutes in your respective sections and bring about in every way their more general success. I am not familiar enough with your service in the past to either commend or criticize; yet I feel it is sufficient at this time for me to say, representing as I do the Agricultural Department of the State in this line of work, that where and when the Department feels that we are not getting your full service, your resignation will be asked for and others will be appointed in your stead.

Now it may be well enough for us to consider for a moment how we may stimulate and increase the interest in our local Institutes. It may be assuming a great deal on my part in making suggestions to those of you who have been engaged in this work for so many years; yet I feel much like asking, Have you done all you could in the past to thoroughly advertise your Institute by posters, etc.? Are you in close touch with the editor of your local newspaper? If not, cultivate an acquaintance with him that he may assist you in getting your Institute thoroughly before your people. In this case, as all others, it pays to advertise, particularly if what you are offering has merit.

On the other hand, you are all no doubt well known by the ministers of your section, the County Superintendent of the schools, the High School teachers, the Farm Bureaus, if you have them, your Farm Agent, if possible, if you have one. Get all these agencies enlisted in your work in getting their most hearty co-operation in the work of furthering the interest of agriculture. Let us then return to our homes from this Institute with a full determination in our own minds that we will take up this work in our respective counties with renewed vigor and a special effort to increase the interest and attendance at the Institutes to be held the coming year.

We have in Pennsylvania our State Department of Agriculture, State College, Grange organizations, Farm Bureaus, with their agents, the agricultural press, etc. But at the head of all is the Agricultural Department of the State, and as I understand the present administration and knowing the present Secretary, Mr. Patton, as I believe that I do, you will find him ever ready to co-operate with all minor organizations in the State for the further advancement of agriculture. Let us then from the Department down, members of the State Agricultural Society, County Chairmen, Institute workers, Farm Advisers, the State College, Farm Bureaus, Farm Agents, Grange organizations, the agricultural press, co-operate and work together in absolute harmony for the furthering of the agricultural interests of this great State and the upbuilding of the church, the home and the school.

Now a few words relative to the work of the past year: The Department of Agriculture held during the season of 1915-16, 397 days of Institutes with an attendance of 150,808 as compared with 436 days with an attendance of 162,269 the previous season, Dur-

ing the season of 1914-15 we had an appropriation of \$22,500.00, while for this work in 1915-16 we had only \$20,000.00. The Governor, in order to keep within the revenue available, was compelled to reduce the appropriations of the different Departments of the State; the Institute appropriation being reduced from \$45,000.00 to \$40,000.00 for two years, making our working capital \$20,000.00 per annum instead of \$22,500.00. Therefore, you will see our average in attendance for the past season is somewhat in advance of the previous year. It is my hope, with the co-operation of the State Board of Agriculture and Farmers' Institute workers, to go to the next Legislature with a request for \$60,000.00 for two years to carry on this very important work, and I feel that if we all work to this end we will be successful.

You no doubt are aware of the very valuable asset we have to agriculture by the State furnishing ten Farm Advisers who work under the direction of the Secretary of Agriculture, whose duty it is to aid the farmers in the manner of adopting scientific and approved methods. These experts take up crop rotation, soil building, plant growth, dairy husbandry in all its branches, together with poultry management and farm drainage, of which there is no greater need for the development of thousands of farms within the State. The market gardener and fruit grower has been fortified in his work, also the co-operation in buying and selling of farm products has directed thousands of farmers as to the best location for marketing their products; and home sanitation and household economics is not the least important branch in this work as it relates to the health, comfort and happiness of the farm homes.

I do not want to take up much of your time going into details as I appreciate we have a very full program before us. However, at this time I want to express my gratitude for the kind co-operation of the County Chairmen of Institutes, Institute Lecturers, the Faculty of the State College and other agricultural organizations, who, upon my entering upon this work, have offered every assistance possible, and I want to assure you that it will be my effort to continue the building up of this valuable educational feature of the Department's work.

The CHAIRMAN: I might add a word in reference to the work you are doing absolutely free and for which you are not compensated. I would like very much to see the State put upon its statute books an act permitting you to receive compensation for the time you spend in this work. Yet it might somewhat work against the interests of agriculture in general. Any man who devotes his time and effort free of compensation along any line, as a rule, accomplishes much more. However, I do hope that the time will come when you gentlemen shall be paid at least a fair compensation for the time you devote, as well as your expenses.

Perhaps it might not be out of place for me to say, that in conversation with the Governor a few months ago, he said the agricultural interests of the State were second, in his mind, to only one other department, placing the Highway Department first. You

have a man at the head of your agricultural interests, Mr. Patton, in whose hands this great work is safe. Again I insist on the hearty co-operation of you Chairmen. There is room for all of us and it is our duty to give our most sincere and earnest endeavors.

MR. KILLAM: As a special privilege, I would like to bring up a matter that will only take a moment. There has been a fund raised here for the purpose of sending flowers to Uncle Joel Herr, as he is known, who is now sick and incapacitated for any further duties on the Board and may never be seen amongst us again. He is still living and I would ask the person who has had charge of that fund if he would make a report as to the amount he has raised, etc., and after that I would like to make a motion that a committee be appointed to see that the intention is carried out.

A Member: I was called on this morning to make an effort to secure some funds for this purpose and I secured \$12.50, which will no doubt buy a handsome floral design for our good friend, Joel A. Herr, one of the oldest members of the State Board of Agriculture. I have this money and am ready to turn it over to the gentleman who is appointed to proceed with the purchase of the flowers.

MR. KILLAM: I move you that a committee of one be appointed to see that the flowers are purchased and to see that they are delivered to Brother Herr and to make a report of his work at our next meeting.

MR. BARNES: I second the motion.

The CHAIRMAN: It has been moved by Mr. Killam and seconded by Mr. Barnes, that in appreciation of our respect to Mr. Herr, an efficient member of the State Board of Agriculture, we send some token of appreciation.

The motion was adopted.

The CHAIRMAN: I will appoint Mr. W. Theo. Wittman as a committee of one to purchase and forward to Mr. Herr whatever he thinks is proper for that purpose.

A BRIEF REVIEW OF THE PAST YEAR'S WORK BY SECTION LEADERS.

The CHAIRMAN: Our program to-day provides for our farm advisers and lecturers with "A Brief Review of the Past Year's Work by Section Leaders," and first on the program, is Mr. Sheldon W. Funk, with whom you are all well acquainted.

MR. FUNK: Mr. Chairman, Members of the Board, Institute Lecturers, Ladies and Gentlemen: As a section leader I do not want to criticise the Institute work in Pennsylvania because I

know that you people have all given it a great deal of thought. It has been carried on for a great number of years, and I do not believe that we can make any great improvement; but I do have a few suggestions which I would like to offer.

As most of you know, I had charge of Section 1, last year, and I think the attendance in the section was greater last year than it has been during any preceding year; that is, considering the number of days of Institutes. We had an average attendance of 500 daily, or a little bit over a thousand to every institute held in Section 1, and we had a few poor days, of course, due to bad weather conditions, but in most cases the attendance was very good and everything seemed to be working along very successfully. As far as the men whom I had with me, I think practically all of them were satisfactory. They all tried to do their best and I think they did do their best.

I have one suggestion to make to some of the newer lecturers, to study the territory a little bit that you expect to enter. We have the soil maps of the State that you can get hold of, and by looking over your territory, you can familiarize yourself with the soil conditions, and I know that it has helped me out a great deal. We had a little bit of trouble last year in not having men suited to the territory in a few cases, but the Secretary is taking that matter up this season and I think that is going to be remedied.

There was also a little bit of trouble along the line of advertising. Now I do not wish to criticise the County Chairmen; I do not believe that a man who is not paid and is doing the best he can should be criticised, but you men of course, the County Chairmen do not get into the different counties as we lecturers do and do not always know conditions, possibly, quite as well as we do, and I do not think you are going to take it in the wrong spirit if I offer a few suggestions, not that I want to criticise, but I have gotten into some counties where the institutes could not have been better. I don't think, where we had all the people that the hall would accommodate and sometimes a great many more, and then we would get into another county not very far away and the accommodations would not be the same. Possibly there were conditions I don't know anything about, but oftentimes I think those conditions could be changed a little bit.

Now in regard to the proper advertising of meetings, I know all of the County Chairmen put up their posters; but I do not believe it is going quite far enough, and I believe there are a few counties where a little more individual work will do a great deal of good. I know that in one or two cases last year, by just talking to some of the men who came into the Institute and picked out one fellow perhaps who seemed to be somewhat of a leader, and getting half a dozen or a dozen more around him, it seemed to form some kind of a little bit of an organization, you might say, that I believe are going to do good work next year, and I am going to watch those places very carefully, and I believe that is one of the ways in which we are going to stimulate the attendance, by getting the local people interested. Most of the localities have telephones and it does not take very long for a man to get on the telephone and call up a few of his neighbors and tell them, "We are going to have an Institute to-day and to-morrow."

There is another suggestion I want to make, and that is in a few counties, a few sections, possibly, the meetings are being held at one place a little longer than seems to be practical. Now I know that conditions alter cases. There are a great many places I know of in the State of Pennsylvania where, by going back to the same place, you can have a better Institute than anywhere else in the county; but there are a few places where that is not true, and I had a little bit of that trouble last season.

Another thing that did a great deal of good in Section 1 last year was the exhibit. I have never been on any section where we had as many exhibits as in my section last year. I know that means a lot of work and I do not blame any county chairman for not trying to get together exhibits, but where you have a local committee that will do it, I believe it should be encouraged. I know that practically all the newspaper men that are traveling with the Institute men will give as prizes a one year or two year subscription, and I believe that most of the newspapers will do the same, and offer an inducement for farmers to bring in a few of their things as exhibits and certainly that will add a great deal to the Institute. As I said, I do not wish to offer anything in the form of criticism, but merely these suggestions that have come to me during the year's work and which I have given to you for what they are worth.

The CHAIRMAN: The next section leader on the list is Mr. D. H. Watts, of Kermoor, Pa.

MR. WATTS: Mr. Chairman, Ladies and Gentlemen. Co-workers: I feel a little bit backward in speaking from the standpoint and poise as it were, of an Institute leader. I would rather be considered by those whom I face and know so well as a co-worker everytime. Now in my experience in Institute work, which began in New York State something like eleven or twelve years ago, I did not feel like imposing upon my home domain by beginning here in Pennsylvania, so I went to New York State. I knew some of the things that would likely happen to me and then I came back to Pennsylvania and through the mercy of my good friend, Mr. Martin over here, the former Director of Institutes, I was given a little work in Pennsylvania, two weeks, I believe if I remember correctly, and during that little experience as an Institute worker, my first experience as I have related, I felt just a little bit backward and bashful. I think Mr. Martin will back those words up; I felt that I did not get the encouragement sometimes from the section leader, section second man, as we call him then, that I should have had, because it was a great tribulation, a great trial. I never did any public speaking previous to that time, not one bit, and the cheer of a good county chairman once in a while I tell you did me a lot of good. Some of those men are not present here to-day; some have gone beyond the river, so I speak with a good deal of mercy toward a lot of our men; but nevertheless in this business the Institute field grows larger and larger and the County Chairmen have great work to do and they must not be asleep on the job—no not one.

You know I have a little faint recollection of something that happened to a minister's son in a little village in my neighborhood years ago when I was a boy of the same size and years as that

boy. The boy's father sent him to the backyard of the parsonage to gather potato bugs and the boy did not like work very well, like lots of other boys, and he slipped around the house and crawled up on the portico roof and there presently, under the influence of the songs of the birds and the warm summer breeze, he fell asleep and after a while, naturally he rolled off the portico roof and struck the ground and got a jar that waked him up. He had been shunning his duties. While there was nothing serious happened to the boy, it was a good thing for him, it revealed his position and his father took care of him for a little while with a green branch from the orchard. I say to you that men sometimes with these duties fall asleep. I was in an Institute one time in Central Pennsylvania when the section was conducted and watched over by my good friend Prof. Menges; one of the men who was comparatively a new worker fell asleep so easy that he did not have that trouble and feeling that I had, and he sat there while I made a feeble address and Prof. Menges made a better one, and the room was very uncomfortable, and just as we were going out, this other man was introduced. He was like the boy on the porch, he had gone to sleep, he was not thinking about his mission or his message either. He got on his feet and began: "First," he said, "I do not know what I am to speak about, I am a little lost, I don't know just what I was to do," and Prof. Menges said, "My goodness alive, what in the world will we do with that fellow?" Well, somebody else took care of him; he had the jar that the boy got when he came off the portico; so we all have something to do, we must not forget the message and the mission. I do not; I still have that backward feeling about me; I think it is a pretty good thing after all. I had it as a boy going to school; the first time I ever appeared on my feet in the school room, I appeared there as a little tot and how I trembled and shook, and when I went to my seat I said to the teacher, "Dont you think it is awful hot in here? Hadn't we better raise a window?" It was awful hot for me but nobody else noticed it.

This Institute work, as we go backwards, is like a midnight dream; we cannot think of things as they have happened. Much of my Institute work is pleasant, most of it; sometimes when I go to a place where we are going to hold an Institute, it don't look very good; I can see a frown on the faces of some of the people, maybe the County Chairman, but usually by the time we go, we lock the door of the hall or church with a good feeling permeating the air. Usually that is my experience; whether it is taffy, a bouquet, or what it is, I don't know; I am glad they have that much respect for those men who travel with me and myself.

Then again we have some experiences that are not very pleasant. In one such instance in the last season we were entertained and taken care of at a hotel that was not very good. I think it was the only one in the town, but we had better be taken to private houses in such a case. I believe the man is not here this morning, I only wish he was, because I do not wish to say anything harmful about that Chairman: I think it was innocence, but we went away from that hotel—Mr. Wittman was one of the men and Mr. McCallum said to me a week afterwards, walking along the lawn of a good suburban home where we were being taken care of in a nice way,

"Do you know, Watts, I can smell that hotel on my clothes yet." I forgot a lot of these things that happened this winter, but it was a way along in April this spring that I was cleaning out a calf stable and this odor came back to me again. (Laughter).

And then there come times when we get into these splendid places and that divides up and blends the sweet with the bitter and we don't have much to say about those things. Sometimes we have a team sent out to meet us at the station or to take us back, and we have to drive through the villages of the neighborhood and that team is not just what it ought to be, but looks like the team of the unthrifty farmer, some very careless fellow, and you may smell that team and equipment on your clothing afterwards. That is not a very good thing. Occasionally that has happened, when my fellow workers would say, "Well, you know Watts it is not a very good thing to have our bunch representing the Institute in a noble work like this carried in a conveyance that looks like this, because people sort of measure us by these things." There is a certain pride and dignity that every farmer does have and should have in his own conveyances around home, the way he goes to church and goes out to market and all that, and that should be the measure, to some extent, of how we go about from place to place.

I have said some things that are a little disagreeable in regard to the County Chairman's duty, and I can say as much about the Institute force and how those men do not come up to the scratch sometimes. I may be one, but I have not time to talk about that. I know we are to be brief this morning.

There are many things that come to me that I think would be an improvement in this work and we should just jot them down. That local advertising mentioned by my friend Funk is very, very important. I often think I would like to be the local chairman of Institutes in my own county or my own neighborhood. I believe the man that can do the most good, after all—you have them here in this room—who can do a greater work and better work than any lecturer we do not want to have chairmen or speakers either that do not pull up to the mark, if possible. It reminds me of a man the other day who came to a farmer, and he is a roadmaster, who ought to be a big man, and he came to a farmer and said, "Look here, I want you to observe Good Roads Day; boost it all you possibly can. Do you know when it is friend?" The farmer said "Yes," the 25th day of May." I am glad the Governor named that day; that is one of the greatest days in the year to me. Away back in 1861 there was a great event happened at my father's home on May 25th, 1861. If it were not for some of these mischievous boys, I would tell them what it was. My father was proud of it, though I don't think he would be to-day if he was living. "Well, now don't you know that's Good Roads Day?" It was the first time the Roadmaster ever knew it was Good Roads Day, but he boosted it for all he was worth, and his road machine allotted to his part of the township work was standing at the cross roads where it had been standing for nine months, not a bolt fixed, not even oiled, not used, and the roads of his portion of the township have never been touched except for a little work with a pick or shovel or mattock all this Spring, and yet he wanted to boost something else outside of his

field. Every man ought to stick to his last and do his part. That good roads business ought to have been threshed out yesterday more than it was; it sandwiches into all this work and these duties we have to do.

Now, fellow farmers, I for one am ready to step down and out of this work whenever the officials of the department find a man that will do the work better and more effectively than I do, I am only too glad to quit. I like to see the work go on because it is the one and only work in which I am greatly interested, save those social conditions that are so closely linked with it. I thank you. (Applause).

The CHAIRMAN: The next section leader on the list is Mr. E. B. Dorsett, of Mansfield, Pa. I presume Mr. Dorsett does not care very much what you may call him and I think you all will agree with me that you will have no trouble in hearing him.

MR. DORSETT: Mr. Chairman, Ladies and Gentlemen: Some years ago a noted philosopher said that when a man is satisfied with himself, his politics or his religion, he is dying at the top and had better send for an undertaker. I am sure that we who have been in this work for a number of years are proud of the record that has been achieved. I am also sure that none of us feel that we have yet reached the top, and I was pleased to hear the Director say that it would be his earnest desire to raise the plane a little higher, and I believe that every County Chairman and every Institute worker here this morning will say "Amen" to that.

There have been many questions raised and most of them yea, all of them, I am in hearty accord with; and I am not going this morning to raise so many. But I want to suggest a few relative to the Institute work. Something has been said relative to the advertising. I have had in mind some changes relative to the method of bringing the Institute before the people. If we had in every county as wide-awake editors as they have in good old York and Lehigh the question of advertising would not be serious. When the editors of those papers take interest enough in our work to follow us from place to place and write up the proceedings of the meetings and give us, not a half column, but sometimes a whole page or two pages, it shows that they are interested in our work; but oftentimes we go into counties or into villages where papers are published as weekly papers and they seem to know nothing about the Institute.

Now there must be trouble somewhere. We must reach the press and make use of the press if we hope to get our meetings thoroughly advertised and I have this thought in mind. All of you are familiar with the various lecture bureaus, sometimes called lyceums and Chautauqua bureaus, their methods of advertising see the pictures of the men who are to appear on the platform, in the windows, and in the press will be a sketch of their lives and with that perhaps a sketch of the subjects they are to discuss. Well, now, I see no reason why we could not follow that plan or why we might not improve upon it. What is the reason that the Institute workers cannot work out an outline of the topics that they are to discuss

and send that in advance to the County Chairman or to the local chairman appointed by the Chairman, and see that that gets into the papers, one or two or three weeks before the Institute is to be held? In that way we will have the meeting brought directly to the people.

Then, again, I am in favor of more letters, more postals than are at present being used. The fact is that the poster that is put up and sometimes not very many of them are put up, I think have become too common. Some of them perhaps hang there from one year to the next and people do not know whether it is this year or last year that the Institute is going to be held, and some of them don't take the trouble to read it.

Then, again, a suggestion has been made relative to the topics discussed. I am quite sure that we can make some improvement along that line; that one thought is this, that we should try, as we have in the past—it is not an easy task—that we should try to see that men are sent to counties who are familiar not only with farm conditions but with the line of agriculture that is followed in that county. If we could do that everytime there would not be much trouble. I think there is one chairman present here this morning—I don't see him now, but that don't matter, a year ago, two years ago, I was in a county and I was assigned a dairy topic, and we did not have very many men at the meeting that morning, just a handful sat there in front of me, and I asked the question, "How many farmers present this morning are keeping cows?" And just one hand was raised, and I asked him how many, and he said one. (Laughter). Now can anyone of you conceive how a speaker, even if he had the gift of W. J. Bryan, could talk dairying to a bunch of farmers and only one cow kept by the whole bunch? (Laughter). Now we cannot always correct that, but we want to, so far as we can.

Then, again, I am not going to say very much about the County Chairman; in fact I think I will let the other fellows lick you. I will keep a little closer to my own line of work and to my co-workers, because I know we are not perfect. I know that this last season there were some interruptions came to my work that were to say the least, disappointing to me, and I was sorry that they came, but it could not be helped, and I think that is true with every worker and it is sometimes true with the County Chairman, but this sort I had in mind. Oftentimes we who are in this work follow the line of least resistance. It is so easy oftentimes for us to get a line of thought worked out and then we must get rid of that at each session and we do not take the time nor the trouble to ascertain whether or not we might change that a little for that particular occasion and do better work. Why, I remember in one instance a year ago, two years ago, I think, the County Chairman is here now, I was assigned a certain topic, had been discussing it the whole week, and that particular time we had an entirely different audience and I took in the situation and I did my best to give them a little different line of thought, and when I was through, the County Chairman came to me and said, "Why, that talk wasn't anything like you have been giving at the other places." Well, don't you know the secret of it all? We must do what the preachers do

occasionally, take a new text and if we do not take a new text, why then, change the subject matter, at least. And so, in that work, I feel that the lecturer ought to have some knowledge of the people that he is to address. Now you can often tell that by looking at the audience. Sometimes I get fooled, just as friend Watts said, but if you get into the spirit of it you can easily tell. I like to watch the faces of the people I talk to and I can tell very quickly whether I struck the right keynote or not, and if I find I have not, I shift the sails a little bit and then watch and usually you can tell, you will catch some good old Methodist brother shaking his head in approval or disapproval and then you know whether you are right or wrong. Now that can come only by careful observation.

Then, again, I would like to say at the evening session particularly where we have two, I fear sometimes that we lose a golden opportunity at those evening sessions to impress upon the people this thought, that it is "not all of life to live, nor all of death to die." I fear many times that at the evening session we ought to get away at least a little from the thought of producing better crops and better livestock, and turn our attention more to that higher theme, the home. I fear sometimes that in those evening sessions we lose sight of that. I know that sometimes the farmers are busy during the day and they feel that they cannot come, and so at the evening session sometimes they are disappointed if we do not stick to the purely farm topics. But I believe that if the evening session is to be an educational session, we ought to have the pupils in the schools at that evening session and particularly when we get up, as we often do in rural districts—one county last winter, I recall that there were three schools within easy reach of one meeting place, and one of the teachers came to me at the first evening session and she said, "I would like to bring my pupils to-morrow, but the Directors object." I said, "Well, you bring them to-morrow and you tell the Directors to come to me and I will settle the bill if there is any to pay." And she brought them next day and no bill has been presented yet. I think that when a Director is so narrow that he won't allow the school children to come into an Institute it is time that he was dismissed from office. We must have the children at least at one session of the Institute if we hope to reach the coming generation.

Now these are some thoughts that I want to leave with you relative to the Institute work. Let us see if we cannot carry out the request of the Director and make the coming year the best year in the history of the State. (Applause).

The CHAIRMAN: Mr. W. M. Patton, of Mosgrove, Pa., is next on the program.

MR. PATTON: Mr. Chairman, Ladies and Gentlemen: I am hustling with a measure of activity as I like to do normally by reason of the fact that your Chairman has said to me that these talks are to be confined to ten minutes. Now to you good county chairmen, in regard to this work I want to offer no word of condemnation so far as my association with you has gone over this Commonwealth from one end to the other. In every county in this

State have I found you men of worth, pleasant and agreeable, and those of you who are here this morning, in whose counties I have been, I can speak of you without a blush of shame upon my face because of our personal association. I never had a wrangle with one of you. Your troubles are your own troubles, and I want to speak to you of our troubles.

First, I think for the best possibly for the betterment of those Institutes, one thing that I am most apt to overlook, in a large sense, is the fact, as some good brother here has stated, that the conditions are so dissimilar in many of the counties as compared with others. It happened to be my misfortune during the past season—I want to change that and say my good fortune, to cover the entire northern tier of counties in this Commonwealth, together with a section of the intermediate counties, and when you get up into Warren, Potter, Tioga, Bradford and those counties of magnificent distances, where they have practically no trolley lines and the snows get deep, the conditions are materially different from what they are in the good old county of York. But that is not the vital question; I would rather have seventeen good, honest, earnest, frank, candid faced farmers in front of me, deeply interested in the subject I am going to discuss than I would five hundred fellows half of whom have no interest whatever in the subject under discussion and come with no intent of carrying away that which I hope to bring them.

Then, again, I like to see farmers of this Commonwealth bring their wives with them to the meetings, if possible. You men as well as myself have attended agricultural gatherings and meetings of a similar character to those we had attended on prior occasions, and we believe there was a sameness about them, and do you know that to-day the women in the home are the chief thinking power, and when that good life companion sits at your side and hears subjects brought out which you have overlooked and when you go home and prepare to retire, or even after you have retired, she says, "There is a subject that occurred to me to-night in a different form from what I had viewed it;" you are going to be more influenced by the opinion of that wife than the opinion of your fellow-farmers, and your wife, if anybody, will call your attention to these things.

Now, another thing, do we, as Institute Lecturers, believe what we are saying? If we do not, we ought to be at home and stay there. Do we as Institute Lecturers, know when we have gotten into the confidence of our audiences and are bringing them something in which we are interested? If we do not, we ought to go home and stay there. In harmony with my good friend Dorsett, to me there is no more interesting experience in the world than to look into the eyes of an audience and into the faces of those with whom I talk and glean there, in clearly spoken language, the fact whether they are interested or not. The truth is that in many instances subjects possibly are discussed in certain localities that never should be discussed; but we want to make it our business, my co-workers in this work, to bring a message to the people that is worth while, to believe in that message, to present it in such commonplace, simple language that they can carry away any thought we have and be open and subject to all the inquiries that may be made and ready to give a definite answer, if we can, and not be ashamed

if we cannot, to acknowledge the fact. I was in a county, the Chairman of which is present this morning, a couple of years ago, when at a certain session during the morning there were 57 inquiries in the box. I have been in other counties in this Commonwealth where a meeting would go forward with such coldness that there wouldn't be a single request at the end of a session or at any other period. We should, in my estimation, find our way into the confidence of the people, into their respect and to that extent that they will believe and know indeed and in truth that we have something worth while, and they will come hungering and thirsting the days succeeding the first after more of the same kind of knowledge and information that was given them the day preceding.

One other suggestion and then I am through. I believe it is our business to work in harmony with all the organized forces along these agricultural lines of the State. I know there seems to be an unfortunate spirit, there seems to be here and there a sort of disposition on the part of certain organizations to practice a certain aloofness that I think should be eliminated in all detail and completeness.

The CHAIRMAN: We will next hear from Mr. J. T. Campbell, of Hartstown.

MR. CAMPBELL: Mr. Chairman and Friends: I have no speech this morning and I am mighty glad of it. The fact of the matter is, I am trying to get out of the habit of making speeches as much as possible. I think I have pretty nearly gotten out of the way of it, but there are a few things I want to say, and I want to say them because I believe in them.

If I may speak from about 16 or 17 years of experience in institute work, which covers the period in which I have been, to a greater or less extent, engaged in this work, speaking from the past season's work, there never was a time in the State of Pennsylvania, in the history of the agriculture of the State, when they needed the work of the Farmers' Institute as much as we need it right now, notwithstanding the fact that there are some, a few possibly, who would take issue with me and differ with that statement. We need them for more than one reason. We need them first, because the world is growing smaller, and perhaps that covers all of our reasons. The world is growing smaller because, with every year and every age, every kindred, nation and tongue that dwells upon the face of the whole earth is being brought closer together by more rapid means of transportation, better facilities for communication, and the problem that yesterday was a problem of a local community probably tomorrow is a world problem, and what affected us not at all in our community a few years ago has become the concern not simply of some remote section of the earth but is our problem to-day. And as I see it, we need the Institutes primarily for that reason, and I want you to think it out because it goes back a good ways and I haven't time to discuss it this morning. I like to look at some of the things that are more fundamental, some of the things that are lying around on the surface altogether, and I have been inclined to look at some of these things in a larger way, during the last year particularly.

Then we need the Farmers' Institutes again because of the fact that the Institute work, as I see it, must become the great open forum of agriculture, for every man that chooses to do so has a place and an opportunity to present his view and his side of the problems that concern the great fundamental industry of the earth, and the Institute's place to-day seems to offer the only opportunity along that line that seems to be open at the present time. A man, whether he expresses that in terms in which you agree with him or not, all the better if he does not, because he presents the side of the subject you have not thought about before, and no doubt you should know something about and think about, and I have come to admire and respect and I like to seek the friendship of the man that don't agree with me; he is the man that does me some good; so we need the Institute for some of these reasons, and during the last year or two in particular, I have learned to turn the searchlight upon myself and if any man goes to sleep in my audience, I want you to come around with a club and wake me up—I'm the man.

During the past year in Institute work, I have tried, made a hard effort, a strong effort, to present some of the larger problems of agriculture, because I feel that the time is at hand when we cannot afford to spend altogether all of our time discussing the things that concern us, getting another dollar out of our farm, however important that may be. The farmer of to-day must be in touch with the great world outside, he must know something of the larger agricultural problems that concern us to-day, and the Institute worker must present something of the larger problems of agriculture, and that means that the man who is going to do that work must be in touch with those problems himself, must have some convictions along those lines and be able to present them, and with that end in view and that thought in mind during the past year, I have made an effort with some of you Chairmen in the counties in which I was called; and unless I miss my guess with the Director, I should not wonder at that, because I undertook some of these things and some people differed from me. I have no doubt you heard from them up at your office. I hope you did, because, as I say, I respect the man that does not always agree with me, I love to have him present his side of the case. Sometimes it is necessary to stir a man up and stir up the red blood in his veins before you can make him think. With that idea in view I have tried, in my humble way, to present some of those questions along that line and I offer this now, not as an apology, because I do not offer apologies, but as an explanation of the fact that some of the work I undertook last winter which some of you people perhaps did not altogether agree with, I had an object in it and a mission to accomplish in doing it.

Then, again, in relation to this work, I am not going to stand up here and criticise, at any great length, the work of the Institute or those who have given of their time toward contributing to the success of these meetings, because I know the difficulties we sometimes work under, and I know that there always will be difficulties that have to be met at the time they come up, and much will depend upon the tact and the skill and the ability of the man that has them in hand to do the very best he can at that particular time. So these

are a few suggestions, though, in a practical way, that I think sometimes would possibly be of benefit and contribute to the success of the meeting, and I think that possibly some of you, though I know not all of you, will bear me out in the statement I am going to make. I am not going to recommend it, but I am going to offer it simply as a suggestion.

I have sometimes thought it would be for the good, eventually, of the Institute, if every community that receives the benefit of the Farmers' Institute in the State of Pennsylvania, it were required of that community that they should furnish a comfortable building without any expense whatever to the State of Pennsylvania, and if that community has not enough energy, enough interest in the work and in their own good and what is undertaken to be accomplished along that line, the chances are that the interest is not sufficient in that community to warrant taking an Institute to it. Now that may hit some communities; but there are some communities in the State of Pennsylvania that it seems to me that all their object in getting the Farmers Institute was because they had a chance to rent a hall for a few dollars to the State of Pennsylvania, and because possibly the men that were doing the work would come to the hotel and pay and advanced price over the regular rates for a couple of days and they would get that much out of the State, and that was perhaps the extent of their interest in the Institute. If we had a regulation of that kind, that sort of work would be cut out. I am not mentioning any particular places; I know that occurs in a few places in most every section I have been in.

Then, again, in the work and the men that are engaged in the work, I like that suggestion of Brother Watts, who gave a little bit of personal history, personal testimony along that line. I am going to do the same thing, because he called to my mind the man at the head of the work, the section leader. I wonder sometimes if he is not the man possibly who is making a hard effort to do his very best and has it within himself, with some training and experience, to make a successful worker, if he gets the encouragement sometimes that he ought to get from those who have had a greater experience. I say I wonder sometimes if we fellows have not been just a little bit careless along that line. And I think that there are those here to-day who could bear testimony to that fact if they were disposed to do it; and so I have tried, within the last few years, having learned the lesson myself as Brother Watts has, in the school of experience, to be just a little bit careful along that line, and I think it pays, and I know that what little I have accomplished, if I have accomplished anything in Institute work, I owe to the encouragement, the uplift and the friendly hand extended to me by a few of the older workers whom I see sitting before me this morning. But I am not here to pay tribute to what they did along that line for me and I hope to try, to my very best, to extend that help to others as I go along.

There is one thing about it, some people get the idea that we fellows around in the Institutes are getting a whole lot of money and having an easy time and that is about the end of it. It may be easy for some people, but it has not been easy for me by a whole lot; as far as the dollars are concerned, if it was only the money I

was getting out of it, you wouldn't find me in it for a minute. I told the folks at home it had got to come to an end. But there is another side of the work, an opportunity that you realize, and the experience and education and training, along with the possibility of extending a helping hand to a needy brother, that is worth while considering and after all gives the work the attraction it has for me. I tell you my friends, today the man that goes out, there never was a time in the history of this world, you may take it in the forum, on the platform, in the pulpit, or anywhere else, there never was a time in the history of the world when the man that had a message got the hearing he gets to-day, and if a man hasn't got learning, he may express that message in laying brick or carrying mortar or in the pupil or on the platform, and if he hasn't got a hearing, he may take his cue from it that he has no message every time, and so that is a point that is well worth thinking about. I tell you we need the Institute work to-day as never before, because there has been accumulated during the past few years, a wonderful amount of accurate agricultural information that is in a condition, we might say—that is not the word, but in the abstract, perhaps, that we farmers cannot and do not make use of because it has never been translated into the language of the farm.

And you may say what you please, my friends, the language of the farm to-day, always has been and always must be primarily a language of the heart; the farmer understands that language and the man who goes out without it, it matters not what he may know in the line of scientific fact or accurate information, he goes out without the ability to put that language into the heart language of the farmers so that it gets under his coat and gets into his confidence, and you will never accomplish what you should. I have seen a man come into Institute work and he hadn't much scientific information, but because he understood the language of the farm and could put his language in harmony with that of the farm, I have seen men crowd around him, he got the farmers' confidence; and I have seen men who had scientific information go out and they couldn't in the farmer's heart and what they said fell in stony places because they couldn't accomplish it.

Let us not forget that fact, and I say to-day that we need the farmer's institute work because we have got that information and the man that can go out and put it in the farmer's language is the man who must do the work. That man must have lived his message, he must have worked out and been in perfect sympathy with the farmer by having lived upon the farm and worked upon the farm and come in contact with farm problems as well as the other side of it, and I say there is a great need of that in the agriculture of Pennsylvania and other states. It is worth thinking about, because the tendency of the times is toward scientific agriculture. The scientific man has done a wonderful work, but the man also is doing a great work who is able to carry that out and touch the farmer's heart with it, so I am inclined to turn the searchlight upon myself.

I am not trying to altogether be exactly accurate, I cannot expect that in my work, but I have tried first and foremost and above everything else to get the respect and confidence, get into that man's

heart and if I can get into the hearts of a few men, my work has not been in vain. Sometimes the man you expect the least of, you get the most from. I have in mind now a man in central Pennsylvania. I attended a meeting where the fat of the land—you don't eat of it like you do in the Lebanon Valley, by a whole lot, but there was in that audience a great, rugged, coarsely-dressed, crude-appearing man, over-grown and stoop-shouldered from the hard work he had passed through, and seen, and I know that we meet a lot of that kind of men, but this one man in particular, before I left that point I trod my way into that man's home, and that man by his own effort and the labor of his hands through years and years of close application, with a family of eight or nine school children, had practically paid for a farm in that rugged country and his heart is just as big as he is. If I never accomplish anything at that point except getting that man's confidence and respect, I will have accomplished something worth while in that particular Institute. The only opportunity I am wanting now is to get back and see that particular man again. I want to go.

So these are some things we need to think about and take into consideration. Those of us who have not seen all the sides of the agriculture of a great Commonwealth forget some things we have got to pay attention to, and I like to think again in this work that I am responsible for the work I accomplish very largely, not that the County Chairman is responsible for what I accomplish altogether, but I am responsible largely. In one of the roughest counties of Pennsylvania a while ago and when I came home a little girl wrote me a letter and enclosed a little card or slip of paper, and on that card were these words, an inspiration, "Love, laugh and live." (Applause).

The CHAIRMAN: We have with us one or two friends from whom we will be glad to hear, who expect to take a train about 12 o'clock. First, is the former Deputy Secretary of Agriculture and Director of Institutes, Mr. Martin, whose figure was so familiar to you all in former years. (Applause).

MR. MARTIN: Mr. Chairman, Friends and Fellow Workers: This to me has been an interesting meeting because, after years of experience in our effort to upbuild the work, I lean more heavily upon the man at home in the various counties of Pennsylvania than any other, in order that we may arrive at some definite conclusion as to the best methods to pursue in order to reach the great mass of farmers in Pennsylvania, and I attribute whatever of success may have been derived and may have occurred and accrued from these years of work, more to the members of the Board of Agriculture than any other one source. Now there is no flattery about that. It is, I found, necessary, and to my own good, to visit you at your homes, to learn of your surroundings, and it may not be only get an inspiration for myself and my work, but impart to you some little inspiration to prosecute this work to the utmost extent.

And again, we have listened, we have been edified, we have been instructed and my worthy successor has no doubt gathered many points from listening to these men of experience, these men actually in the field, coming day by day in contact with the actual condi-

tions that exist on the farms of Pennsylvania. I expect if life is continued in me, to witness before the next decade passes, such an advancement in this great, broad field of Farmers' Institutes and Farm Advisers and farmers schools under the Department of Agriculture as would astonish the most hopeful, and why? Because it is a work which, if carried on properly, is fitted to meet the conditions. Naturally so. What we need in my judgment in Pennsylvania are men of apt, actual and right knowledge and experience who have worked out the problems of agriculture so far as they are concerned, upon their farms and in their homes, and with that kind of an inspiration, meet the farmers of Pennsylvania at their various homes and in their places of meeting, armed and equipped with that kind of knowledge, and make the Farmers' Institute a development of a higher and a better agriculture.

It is not all the money we attain, my friends, but it is our knowledge and conception of a real home life, it is the strength of a community, a grand home life, it is not only the strength of that community, it is the strength of the State, it is the strength of the nation, and the occupation you here represent and in the interest of which you are called upon to meet, is one than which there is no more important in all the occupations and professions known to man. Do you appreciate it, my fellow farmers, at your homes? Do you appreciate the fact that you stand sponsors for the greatest work that has ever been commissioned to mankind? I trust you do, and as we return to our homes and I go to my home and my farm life, let me say to you that the work you have sustained me in for the last nearly two decades shall never be erased from my memory, neither shall your acquaintances, neither shall the memory of the kindness and the forbearance which you have sustained towards me during those years. I bid you adieu. (Applause).

MR. DORSETT: Mr. Chairman, with your permission, I would like to read the following telegram:

"Harrisburg, Pa., May 25, 1916.

The Farmers' Annual Normal Institute,
Reading, Pa.

Greeting: After an unbroken record of sixteen years' attendance. I feel it a real loss to be unable to greet my many friends. Accept my sincere wishes for the continued success of the Institute.

MRS. A. L. MARTIN."

The reading of the telegram was received with applause.

MR. DORSETT: Mr. Chairman, I know that you have missed the kindly face, the helpful suggestions and valuable assistance that Mrs. Martin has always given us at these annual meetings; and I move you that we accept her words of greeting and that through Mr. Martin we extend to her our best wishes for continued health and the hope that she may be with us at our next meeting.

The motion was seconded by Mr. Fenstermacher and was unanimously adopted.

THE CHAIRMAN: We have another friend with us to-day whom I have known for more than a quarter of a century and whom, I am sure, you will all be glad to hear, Mr. T. D. Harman, one of the Editors and Publishers of the National Farmer and Stockman, of Pittsburgh. (Applause).

MR. HARMAN: Mr. Chairman, Ladies and Gentlemen: I feel that it is a crime for me to waste your time, but Ed. Carothers insisted on it and I have consented to say a word or two. I want to congratulate you on this meeting. I have attended meetings of this kind, not every year but for a number of years. I presume it is 35 years since I have been going to your annual meetings and as many of your farmers' institutes as I could get to. I have got to make a living, consequently I cannot go to all of them. I believe you have got a better institute here, a better meeting than I have seen for a long time. I remember 35 years ago, I believe it was, of a meeting at Butler of the State Board of Agriculture. Since then Mr. Martin, who just preceded me, asked me once to make an address at Huntingdon, Pa. I am not a speaker, I want you to understand that. To illustrate that, I will tell you a little circumstance: I was out in Ohio one time and they were short of speakers, so they came around to me and insisted that I take some man's place. Well, I got up and thought I did pretty well; I stumbled along and got through, but I started out by saying that I was not a speaker. After the meeting was over, an old farmer rushed through the crowd to shake hands with me. He said, "I want to meet you, you are the only man on that platform that told the truth." (Laughter and applause). "You said you couldn't make a speech, and I'll be dammed if you can." (Laughter). There was an honest man; it did me good. I have not butted in very often since, if I can help it, and I do not intend to. I am interested in the topic under discussion; I presume that is what you wanted, Mr. Carothers. Mr. Carothers and I talked this over last night; he is a new man, you know, and he said, "What would you suggest along this line?" I said, "I would suggest that you go out and live with these fellows who are speaking and see how they live, and if they do not live right, don't let them talk." That was his suggestion too; he said, "That's what I want to do."

To illustrate that, I want to tell a little incident or circumstance. I am older in this game than I look. Over 30 years ago I was at the Columbus State Fair and a long, gangling boy came up to my office hunting me, and he said, "Are you Mr. Harman?" I said, "Yes." He said, "I want to talk to you." I am afraid to imitate his voice, afraid you will recognize him. He said, "I want to talk to you a little about getting into different work from what I am doing. I am running a farm down in the tall grass, in lower Ohio. I went through college; I studied—I was going to study for the law, and my father died and I had to go back and run the farm, and I feel that I am hiding my light under a bushel, if I have any light and I believe I have if I can develop it." "Well," I says, "what have you done?" I says, "What have you done to get into the limelight?" He says, "Nothing." I says, "Have you run the farm?" He says, "Yes." "How long?" "Four or five years." Is it any better than

it was when your father left it?" "Yes, I am making twice as much money as father did." I says, "What are you doing?" He says, "Well, I have improved that farm, I have improved it and I am making more money and it is getting better all the time." I says, "Can you write?" He says, "I don't know, I never tried." I meant write articles for publication. I said, "You go home and the first thing you do, write to me and tell me what improvements you have made and what your ideas are on improving that farm. I want to know whether you are going to amount to anything or not, and then I will tell you whether you can write or not." And he did so and he started in to write and he got into the limelight from time to time, but he did it on his merit alone, on his work. He started on that and has done it ever since. I have reference to Alva Agee, that everyone of us knows, possibly. (Applause). I tell people when I meet them with Agee that I discovered him. I wouldn't have given ten cents for that fellow when he walked up to me there, but I saw he was honest, earnest and sincere and I just took a chance on him and I want to tell you that I had to revise manuscript quite a good deal when Agee first started; he can revise mine now, and I am glad of it, but Agee started in that way and I do not believe he has a superior in the United States as an educator, and especially among farmers and farmers institutes.

I am glad to see you discussing the matter of improving. I have another suggestion for the Secretary: I believe that if I was in his place and running the Farmers' Institutes of Pennsylvania, I would get something new for each speaker; I would get an alarm clock, and when a man was to speak 20 minutes, that clock would go off. (Laughter and applause). I would even go further, I would fix that alarm clock on a contraption, I don't know what to call it, that would fit on his shoulders with a great big shield up above, and whenever that clock went off that shield would drop down to his breast. What a relief that would be; I believe it would work. Will you try it? I am offering that in a serious way. I think they would come to see the alarm clock and watch for it to go off. I think a lot of audiences are killed in that way.

The matter of publicity—that struck me. I am in the publicity game. I want to tell you why you do not get as much of it as you might. The people that publish a paper to-day, not my kind but publishers of newspapers, do not publish anything unless it is news. I have been turned down a hundred times in the last couple of years with a little publicity I wanted to work off in Pittsburgh. I happened to be the head of a big organization there and I wanted to get all the publicity I could, and they would say, "There isn't a news item in it," and when I'd look it over, I could see there was not. Now you will go here and there and elsewhere and possibly say the same old thing, and the reporter that has to make a story out of that cannot do it because he would repeat himself or he would kill himself, that's all there is to it.

There is one item I want you speakers and those in charge to make a note of—it is absolutely right; I have that trouble a little in our work, but not so much. You take a newspaperman and he has got to know it is news or he will break his own neck in publishing it twice. I think your suggestion, Mr. Dorsett, in regard to that advertising in the way these Chautauquas, etc., do, the pictures,

I think that is personal matter, I think you fellows are working to get your pictures in the window; I don't like that for a minute. (Laughter). I want to tell Mr. Carothers that if he does that, he will have to change his force. (Laughter and cries of sit down). It will kill the whole proposition. (Laughter). One thing I can say, gentlemen, for the speakers of the Farmers' Institute, they are not two-faced men. I want to illustrate that by a story of Sam Jones. He preached for a preacher down in Georgia, wherever he lived, the preacher wanted him to come out and preach for him and he did, and the preacher was a very homely fellow and Jones got up after the preacher had introduced him in a flowery way, and said, "I want to congratulate you on having one of the best preachers in Georgia; he is one of the finest men I know, and one thing about him you can say always that he is not a two-faced man. God knows, if he had another one, he would wear it." (Laughter). Like the fellow said about his wife's mother; her name was Helen Summers, and he said she was just the same in the winter time. (Laughter and applause).

This seems to be a meeting for suggestions. I have often wondered why you don't get more local people at these meetings. I was going to ask how many of you would be here if you didn't have your fares paid, but I won't ask you to put your hands up; but the trouble is to interest the people to the extent of getting them to come out—that is what you want to do. I don't know how to do it. There have been a good many suggestions made here; I don't know how it can be worked out. I am just as much interested as anyone on earth in my own personal way, business way, to have the Institute successful, because when that is so, the farmers are going to be prosperous and everyone engaged along that line is going to be helped and I am ready to help in every way we can. The trouble with a paper like ours is that we cannot advertise a local institute because we go all over the country and have so many programs sent in that we cannot do it, because there may be 50 institutes held in the territory we cover, and you have to depend on your local newspapers, and when you go into a newspaper office and want to get a little space, you have got to give them something in the way of news. Some of you never thought of that, but it is a fact, I have learned it myself by being absolutely turned down a hundred times in the last year or two. I was trying to get something, and it is true all over the country. I appreciate the fact, ladies and gentlemen, that I have been able to meet you again. I have missed out on several occasions of this kind, but I hope to be around again and I thank you for your attention. (Applause).

The CHAIRMAN: Mr. Chester, of the Pennsylvania Farmer, is present and we will be glad to hear a few remarks from him.

MR. CHESTER: Mr. Chairman, I assure you they will be but very few. I was thinking during the days we have been meeting here, of the gold old times in which I have met with you, with one exception, for, I think, twelve years, and I am over-joyed at the renewal of association. I do not find that any of you seem to look any older or appear any older or in any way different except that

you are no doubt wiser, and I am sure better-looking than you were years ago. These meetings have been, this especial meeting has been of unusual merit and interest. I am sure that each of you will have renewed purpose. They will have the effect, no doubt, of the revival meeting referred to by a minister who came into a community to assist the local minister in holding a revival and appeared to be very successful. A great deal of enthusiasm was aroused and as the visiting minister was making his final speech and offering the closing prayer, he referred to the old minister, who was a resident there, and no doubt had become somewhat aged and decrepit; he prayed that the minister of that charge, because of these meetings, might be "filled with fresh veal and new zigor." (Laughter). And I hope that these meetings will fill you with what the minister had in mind when he made the prayer. The old minister afterwards, remarking on it, said he didn't mind having plenty of fresh veal forced upon him. (Laughter).

Since I was with you, the heads of the organization have changed. I am pleased to see that the same interest is manifested by them; they are taking up the work and carrying it on and furthering it to the end as suggested. I felt a sort of personal pride in the appointment of the new Secretary of Agriculture, because we grew up in the same county, some six miles apart. I had been to Secretary Patton's farm when I found him with gum boots on up to the knees pitching manure into a manure cock, and I know he is interested in agriculture, and not only interested in it, but he knows something about it, so you may rest assured that you will have his hearty sympathy and support and direction in the work of the Department.

I have been interested in the suggestions made by the Institute workers for the improvement of the work. No doubt many of them have been made heretofore, and I hope that they will be carried into effect. The matter of publicity, local publicity, has been talked over and over at our round-ups for a number of years, but in some way or other I have not been able to see that it has been carried out. As I gathered it from my work, it was one, if not the most necessary thing, as a matter of improvement. I have been in localities, and so have every one of you, where the programs for the meetings of that community were not opened until the first session was called and the string cut, and then they were distributed to the few who were present. That kind of publicity is too meager, there must be a knowledge of what is going to occur, of the subject to be presented. There must be an enthusiasm worked up because if I am interested in poultry or in land drainage or liming or in raising alfalfa, I want to hear it, and if I don't know whether there is going to be anything there for me or not, naturally I haven't much enthusiasm for going. I want to impress upon the new officers and renew the impression upon you, to keep at it, that the great need is not only to increase the attendance—let that be the object—but to increase the spirit, to increase the interest, and hence to enhance the value of the Institute to the communities of Pennsylvania, and advertising helps to do that better than any other way I know of. Anything we can do in the State to help the Department of Agriculture in any

of its lines and especially the Institute work, I assure you that the Pennsylvania Farmer stands always ready and willing to do, glad to do it. Now, I thank you for your attention and for this opportunity and hope never to lose my interest in the work of the Institutes of Pennsylvania. (Applause).

The CHAIRMAN: The Board of Agriculture was taken out last night and shown the new improvements at the fair grounds here which I understand have been on a very extensive scale and fill one of the greatest places in educating the people to vast ideas in agriculture and increases the interest in competition in the growing of crops, etc. We have with us at this time Mr. McDermott, Secretary of the Berks County Agricultural Association, from whom we will be glad to hear. (Applause).

MR. McDERMOTT: Mr. Chairman, Ladies and Gentlemen: As an entire stranger in your midst, I appreciate that applause. It reminds me of a little story of an Irishman who was walking along the road one day and saw a bull over in the field, and the animal was pawing and tearing up the ground and throwing the dirt in all directions, and the Irishman thought to himself, "What a jolly good thing it would be to go over the fence and take the bull by the horns and rub his nose in the ground," and the idea so amused him that he began to laugh and laughed until his sides ached, and he thought of the great time he would have. He jumped the fence and went to the bull and got hold of his horns and what the bull didn't do to him I couldn't tell you in hours. When he got outside the fence and looked over at the bull, he said, "Well, I'm glad I had my laugh first." I'm glad I got my applause first. You were out to the Berks county fairgrounds yesterday and saw what a magnificent monument we have erected there to the interest and benefit of the farmers of this county, and since 1915, to the interest of the farmers of the whole State of Pennsylvania.

In 1915 the Legislature passed a bill which permitted us to pay premiums outside of Berks county and on all products that are produced and exhibited in the State of Pennsylvania. We have a tract of ground which contains 60 acres of land, and some one had said that God made the land for a Fair Ground, and then it took two Berks county Irishmen, Henessy and McDermott to discover it. (Laughter). We have it fenced with a wire fence. You ask why we did that; it is the easiest thing in the world to explain—because you can always see them on the outside when they are trying to get in. We have one of the finest race tracks in the United States; in fact, the only half mile of its kind in the United States. It is known as a Billings Track. I could not explain the features of that track to you in an hour, if I tried, because of the many good features, but one of the things about it is that the horse starts to turn and don't know he is turning. One of the great things of the track is that very fact, and he continues to go with unbroken speed.

We have three buildings out there that are seven hundred and forty feet in length. They are joined together; they cost \$26,000.00; they are built of hollow tile, concrete and steel. They have on them slate roofs—not slate, but asbestos shingled roofs, the finest and

most expensive that could be bought. Everything we have done, we have done and accomplished in the short period of ninety-four working days from the day the contract was let until the day our Fair was opened, and four days thereafter we had a total attendance of 57,592 paid admissions; something we have never heard of before in this district. We did this all in ninety-four working days, raised \$98,000.00, and when our Fair closed, we owed no man a cent, everything we have there is paid for in full; we increased our capital stock from \$100,000.00 to \$200,000.00 and have a campaign on to-day to raise \$50,000.00 more, for which we want to put up some new buildings, a poultry building, an additional barn and an especial building for woman's work. These are the things we want to accomplish in Berks county before our Fair opens on the 12th of September of this year, and we are going to do it.

You talk about how to advertise Farmers' Institutes—come to Berks county and get the lesson of how they did things for the Fair and your question is solved. The reason you do not get the publicity for your Institutes is because you do not go out into the community and get your farmers interested in your Institute. You advertise two or three or four men to go into a community to lecture. Get the man at home to help go out and ask John Jones to be a vice-president; go out and take a lesson from Billy Sunday, organize a choir of 250 people, men and women, in the community, the farmer, the farmer's wife, his son and daughter, and ask them to meet and rehearse for two or three weeks before the Institute, and I will guarantee you that you won't get a building in Berks county or any other county in any community that will be large enough to hold the crowd.

And then you have got to have a Billy Sunday there to talk to them. The great trouble with your Institutes is that your Institute lecturer is the greatest advertisement you can have; get a man who is wrapt up in his work. I believe in the man who is earnest when he does things, and if he is really in earnest, he will get enough life, energy and action into everything that he does and says that the people who come and hear him will come and hear him again, and your alarm clocks won't be necessary; they will want him to talk for hours. You have got to get men who have things to say, men who have a message for the people, and he has got to know how to deliver his message.

I have been interested in Farmers' Institutes for four years; I have followed them, and I will say this to you I was raised on a farm, I lived on a farm for twenty-four years, and in the four years that I followed the Farmers' Institutes, I have learned more about farming than I ever knew during the 23 years I was on a farm. (Applause) I will say that you have got the right spirit and you are going about it in a certain way; but you have got to get the energy and action and the life, you have got to have the right kind of a man to send into each community. Don't think for a moment that you are talking to a farmer who is coming to an Institute who doesn't understand everything you are telling him; he has it and knows it, and the moment you make a mistake and talk too long and talk too much about nothing, that is the time he loses interest and won't come back again. Don't think for a moment that you can

get up on a platform and, because an hour of time is assigned to you and the State of Pennsylvania pays you for it, you have got to talk and talk a lot of nonsense. Get down to the real solid facts, and as soon as you have told them the facts, give them something else to put life into it, that is the thing that counts. If I were at the head of the Agricultural Department of the State, I would organize a school and make every man come into my school and make him qualify before I would let him go out.

A Member: Learn him how to break off.

MR. McDERMOTT: Yes, sir, I would, I would train him and send him forth and make him a lecturer worthy of his hire.

Now I want to tell you this, because I feel this—the Berks County Fair is here at this moment, it is here in the interest of the farmers, it is here for their benefit, it is here for their reward, it is here because you have to tell the farmer how to produce. The Fair Association comes along and they pay him the reward. That's what he wants; we all want the reward, we all want to be worthy of our hire, and if you raise potatoes such as your farmers can't raise and bring them to the Fair and put them there on exhibition, they are an education, and the great trouble with the Fairs throughout the State of Pennsylvania to-day is that they are sufficiently educational. Every Fair ought to be a lesson, a lesson from the time you enter the gates until you leave them. Every Department ought to be there to instruct, and that is what we are going to have in Reading in 1916. We believe that the good old Berks county Dutch people can come to the front and show the people of Pennsylvania that the men who live in the county, who are farmers, believe that they can just as well stand at the front as stand in any other place. We are proud of our people and proud of our Fair, don't forget that. I am sorry you were not all there yesterday. Oh I was primed and fixed and I lost a great opportunity to make a speech. (Laughter) I wanted to tell you something right there on the ground, and when I am wound up I can say it. Now I want you to know something about the Fair. I will tell you anything you want to know about it or any other Fair or affair. I contend that I know it all, and if you don't believe it, ask me. (Laughter).

A Member: Isn't it more a place of amusement than anything else?

MR. McDERMOTT: No, sir; a Fair that is built for amusements only loses its strength of character and down she goes, and out she goes.

A Member: She ought to.

MR. McDERMOTT: Are there any other questions? The midway is like the base ball field or the backyard of a schoolhouse; the boys go out and play between times: it is so with you and so with everybody else, and that is the trouble with the Farmers' Institutes, they are all work and no play. Make them a place for toil and make

them a place for play. Give them the innocent amusements. We ask people to come out and criticize the manner in which the Berks County Fair is conducted, it is clean and pure from end to end. We have ministers who are members and stockholders and invite them all to come; we tell the District Attorney, the County Detective, the Judges and everybody else to come out and look us over and if there is anything there they don't want, out she goes. We have a capital of \$200,000.00 and the stock is \$10.00 a share. I don't want to sell you any, because there is only two thousand left and it is worth \$12.33. We don't want to sell you any. Under the general incorporation act in Pennsylvania we are entitled to incorporate in a local county and can pay dividends. You men are all fair men or you wouldn't be here; every agricultural society aids in your election, you are all fair men, and I want you to go home with this message—I don't care for you to tell anything about Berks county, but I would like for you to get the message from Berks county and go home and do good in your own county. I say that a Fair properly conducted is a greater educator than any Farmers' Institute that was ever held.

Some of you would like to know something about Fairs, but you have difficulties at home. Now, the little Fair can be just as successful as the big Fair and can make as much money. The great trouble with your Fairs at home is this, you have been giving away tickets of admission for years, you have been giving your space for nothing and permitting everybody to come in and pat you on the shoulder and say, "Jones, you are a good fellow and I'd like to fetch my wife and family in," and you have been giving him tickets. You cannot exist that way and never will exist that way. When you give tickets away, give them to people in New York and Chicago and San Francisco and Baltimore and other places where you know they won't come, and then you can say that you have advertised it.

A Member: How many paid admissions had you last year?

MR. McDERMOTT: 57,592.

A Member: Do you pay for any amusements on the ground?

MR. McDERMOTT: We do; we have spent \$2,500.00 for general attractions for the public. Our attractions are clean. Our horse races cost \$3,450.00; we had no entrance fee.

A Member: We had 57,000 people in one day.

MR. McDERMOTT: Yes, that's all right, you are from York, aren't you? (Laughter) But don't forget, my dear sir, that the best Fair we ever held in Berks county previous to this year, the attendance was only 20,000 people. We are proud of such an increase; you can't do that in York.

A Member: Come over and we will show you.

MR. McDERMOTT: You cannot double you attendance in York in the next ten years.

SECRETARY PATTON: Was the agricultural display here any better than last year?

MR. McDERMOTT: Yes, we are going to have it again in all its departments, every one; we are going to wake you fellows up in Harrisburg, there isn't a thing you have got over there that we are not going to make a demand on you to borrow; our representative will be in Harrisburg for everything Harrisburg has.

SECRETARY PATTON: We had a good display last year.

MR. McDERMOTT: Yes, one of the best in Pennsylvania, and I will say this for the Department at Harrisburg, if you go at the right time and in the right way, you will get from the Department anything you want. Now I don't want to make any speech; I am not here to make a speech; I am here to answer questions and explain anything about the Reading Fair Grounds. I was haled away from the office this morning at half past nine and I didn't want to come.

A Member: Have you any trouble keeping order on your grounds?

MR. McDERMOTT: We had four State Policemen and two Constables; we have no strong drinks upon the grounds. We were told that we could not do it in Berks county and the moment they told us that, we made up our minds that we wouldn't and showed the people we could stick to our purpose.

A Member: Did you get the State appropriation?

MR. McDERMOTT: That is a sore subject and I would rather not discuss it in front of the State officials. (Laughter) Somebody blundered.

A Member: I would like to ask you one question. Do you give as much attention to the agricultural end of it as you do to the trotting end?

MR. McDERMOTT: We do, we give more; we have only got one committee on the trotting end of it and nineteen on the other end of it.

A Member: What are your agricultural premiums?

MR. McDERMOTT: We paid in cash \$2,400.00; the State of Pennsylvania once upon a time paid us \$500.00, then we got a little active and got them to increase it to \$1,000.00; then we got a little more active and they increased it to \$2,000.00; every county agricultural society is entitled to \$2,000.00 if the Act of 1915 is constitutional. If it is not constitutional, every county is entitled to \$2,000.00; two Fair Associations are entitled to \$1,000.00 each. But up in New York State they pay 80% of all premiums, no matter how small or how large the Fair is, up to the extent of \$5,000.00 to any single Fair; there is where we in Pennsylvania are behind New York.

SECRETARY PATTON: Don't you think there ought to be some restriction on the number of Fairs in a county?

MR. McDERMOTT: Why should there be? Why should there be any restriction anywhere on Fairs for educational purposes?

SECRETARY PATTON: That is the question, if they are all educational.

MR. McDERMOTT: The law can govern that.

A Member: You have a stock company and are making money out of it, you shouldn't have a cent from the State.

MR. McDERMOTT: I will argue that question, if necessary.

A Member: I think that point is well taken; any organization that pays dividends has no right to receive State appropriations and should not have any.

SECRETARY PATTON: I like to see the appropriations. But I think where you have more than one Fair in one county, you are having too many and cannot keep them up; people lose interest; don't you think so?

MR. McDERMOTT: The reason why it is lawful and legal for an association that is conducted for profit to receive appropriations from the State in which it exists is the fact that it is disseminating a greater amount of knowledge than the State itself could disseminate for the same money.

A Member: How do you disseminate knowledge?

MR. McDERMOTT: We disseminate knowledge just like this. We have, for instance, an exhibit of apples, forty or fifty different kinds of apples exhibited, with each different kind of apple being labeled stating what it is. John Jones comes along and he sees an apple and says, "Well, that is a Baldwin, I never knew that was a Baldwin apple." He sees the different kinds of apples there exhibited and he will say to himself, "Why, I have been buying the poorest kind of apples all my life, this is the kind I should buy and will buy." He is educated to know what is the best kind, and consequently he goes and gets it and he gets that information from no other place except where they are exhibited. It is educational because the State sends us a certain number of lecturers to lecture on various subjects during the week of our Fair. It is educational because you can compare conditions. It is educational because it puts a prize and pays a premium for a man who will produce and a man who will seek knowledge to produce on his own farm. You trace this backward—

The CHAIRMAN: I am sorry to interrupt you, but we have an important part of our program yet.

A Member: There is a great deal of dissatisfaction among the farmers at the Fair people who are interested in Fairs all over this State. There may be somebody—the gentleman on the floor may be able to explain why it is that some of these Agricultural Societies

have received their appropriations and paid out and got their money and others are being refused. Now, it is causing trouble and the Department of Agriculture is greatly criticized in some parts of this State in regard to it. Now if there is any gentleman here on the floor, or the Chairman or anybody else that can make this subject plain so that we can take it home and explain it to our constituents, why that is the case and what the remedy will be or whether there ever will be a remedy so that we will get our money for the different agricultural organizations of the State, I would be glad to have him do it.

SECRETARY PATTON: As far as the Agricultural Department is concerned, it does not have anything to do with it.

A Member: But you cannot make the people believe that.

SECRETARY PATTON: The list is handed in to the County Commissioners and they pay it and collect off of the State through the Auditor General and the Agricultural Department has nothing to do with the premiums. You make out your list, go to the County Commissioners, they O. K. it and you get the money from the Auditor General. The ones paid have been paid by the County Commissioners and I do not think that any premiums have been paid by the Auditor General of the State yet; he sent me a list and asked me to O. K. it and I told him I had nothing to do with it.

A Member: You said that every member here is elected by a Fair Association; that is a mistake.

MR. McDERMOTT: An Agricultural Association.

A Member: Our Agricultural Society of Lebanon County, the oldest in the State, is no Fair association; we hold a free exhibition in the Fall and we pay a small premium. We have nothing to do with the County Fair of Lebanon county; that is another organization, and the Fair organization stockholders are mostly from the City of Lebanon and very few farmers are connected with it, and they pay very little premiums to the farmer if he puts anything there, that is the reason there isn't so much farm produce or stock at the Lebanon County Fair, because they don't pay the premiums the farmers think they should, and we have the two organizations, but ours is the oldest.

SECRETARY PATTON: About the only free instructors you had at your Fair were the ones that the Agricultural Department sent to you, or the Departments of the State?

MR. McDERMOTT: Yes, from the various Departments.

SECRETARY PATTON: They were the only ones you didn't have to pay?

MR. McDERMOTT: Yes.

SECRETARY PATTON: So we were helping you in a way?

MR. McDERMOTT: Yes, I have given you that credit. I am sorry that I could not be with you on Tuesday at your opening. I would be glad to be here, but I am a very busy man at all times. I am delighted to have had the honor and pleasure of being here to-day. It is a great deal of satisfaction to know that all over Pennsylvania men and women of your type are working for the uplift of the agricultural interest, and it is a good and great thing for the State of Pennsylvania and I sincerely hope that God may help you in your work and help you to do these things in a greater and better and more sincere way. I am glad you came to Reading; I hope you will come to Reading soon again, and I can assure you that whenever you come you will come with a great deal more credit, you will come with a great deal more readiness and you are going to be received royally. It takes a little time to get into the hearts of the Dutch, but when you get in, they are going to use you right. I am glad you are here and I thank you for your attention.

MR. RODGERS: Now, Mr. Chairman, just one word more. This question has been answered by our worthy Secretary of Agriculture, so far as it goes. We have got the order, the Commissioners won't pay it and they say it is because the Auditor General won't grant it. Whose fault is it? I am told it has been declared unconstitutional. Is there anybody in this house that can tell why it has been declared unconstitutional to pay this money out?

The CHAIRMAN: Mr. Rodgers, I am sorry to say that we are injecting a matter into our session here that we did not devote any time to or expect to take up, and we have a very important part of our program here, one in which I am very much interested personally, and that is to hear from the Chairmen of the different counties. However, if the Secretary can answer Mr. Rodger's question very briefly, we might have it answered.

SECRETARY PATTON: I do not know on what ground they declared it unconstitutional, but the whole trouble is that the first appropriation was \$100,000.00, then we cut that down to \$2,000.00 to any one Fair and \$4,000.00 to a county. In changing the bill, they cut the appropriation down in the legislature to \$100,000.00 but did not change the amount; then the Governor cut off \$50,000.00 and left it only \$50,000.00 for two years, which would be \$25,000.00 a year, and the amount to be received by each Fair Association or by the county was left the same, which was an impossibility, and I don't know how anybody could work it out. I would not want to undertake it; there is a premium list of about \$108,000.00 turned in; about \$85,000.00 of those were legitimate, and to pay \$85,000.00 with \$25,000.00 is beyond my capacity. I wouldn't know how to do it.

The CHAIRMAN: Before we take up this other matter, Mr. Kester has a word or two.

MR. KESTER: I felt that I ought to say a word in relation to part of the program this evening, that by Mrs. Rose Morgan, on "Songs That Live," not because it will make much difference to her,

but because I would like every one who can possibly do so to hear that splendid lecture and splendid entertainment. I heard her two years ago in Washington at the National Association of Institute Workers, and a few of you may have heard that lecture. It is worth travelling a good distance to hear and I know you will appreciate it. Some one has said, "Let me write the songs of a Nation and I don't care who makes the laws." Mrs. Rose Morgan's splendid lecture is based upon that thought. I hope you will have a piano here, she not only lectures but sings and plays her own accompaniment, and I assure you it will well worth while for any of you to stay over, and I hope that the people of Reading in large numbers will turn out to hear her.

The CHAIRMAN: It is now a quarter of twelve, and I wonder whether it might not be well to adjourn and reconvene again at one o'clock if we feel we can get back.

A Member: According to our program, every one of the members has five minutes to talk. I want to have a chance to find out whether I am going to conduct the Institutes as you expect me to, or not. I was Chairman of the County Institute for twelve years and went around the county and carried the speakers free of charge and hunted up places for them to stay and furnished buildings, where I could, free, and where I couldn't, when I found a church that was poor and didn't have anything and we had to pay for the light and fuel, we did so. There is a chance here to know a whole lot about what to do to make our Institute a success, and I believe it is a very important feature of this meeting, and if you do not give the members a chance to talk and tell their experiences so that they will learn things, what are we to do? (Applause).

MR. CAMPBELL: We lecturers want to hear the other side.

MR. SCHULTZ: I believe that we ought to continue the meeting until we are through with it.

A Member: I move that we adjourn until one o'clock and take this up then.

(The motion was adopted and the session adjourned.)

May 25, 1916: 1 P. M.

Hon. Charles E. Carothers in the Chair.

The CHAIRMAN: It has been suggested that we take the counties alphabetically. Adams county, Mr. Weidner.

MR. WEIDNER: I don't believe I have anything at this present time to say.

The CHAIRMAN: Well, we would like to hear from you now.

A Member: I believe that most of these members here should say a little something about the Institute work. You are, the head, the Chairman of the Institutes in your county, and I should think you would have a few words to say.

The CHAIRMAN: Mr. Weidner, have you any matters to mention with reference to next year?

MR. WEIDNER: The Institutes held in Adams county are not as largely attended as in some of the other counties, but I believe as Mr. Phillips spoke this morning—we have attentive listeners. I think those who attend take an interest and are very much interested in what is being said and try to carry it out. We do not have a great many people come just for the name of the thing, but they come for information, and I think that we will have better attendance the coming Winter; I hope we will. We happened to strike a very bad time, the roads were in a bad condition and it is snowing nearly every day when we had the Institutes in Adams county, so that the attendance was, not what we expected.

The CHAIRMAN: Next, is Allegheny county, which is not represented. Next is Armstrong county; Mr. Blyholder has gone. Next is Beaver county, Mr. Dunlap.

MR. DUNLAP: Mr. Chairman: I am sorry to tell you that the people of Beaver county have not come up as they ought to, for two or three reasons: The first Winter I had charge of the Institute, a blizzard struck us and it was 14 degrees below zero, right along all the time, and that interfered with us very much. Last year the gripe struck us and there was sickness in almost every family in each part of the county, and that interfered with us very much. But our folks are very much interested in their work and when conditions permit, they turn out very well. The only thing about our county is that they are too far scattered away from trolley lines, and we do not have meetings enough, that is, they are not divided enough to allow the people from the different sections to get there with their own conveyances, and we are very anxious that we should have more Farmers' Institutes than we have been having, but I am satisfied that when they can get there, they appreciate the instruction that they have received there. Our folks are alive to their work and they are always hunting information and they are always ready to ask questions. The instructors who have been there have always given good satisfaction.

The CHAIRMAN: Glad to hear it. Bedford county, Mr. Biddle: he is not here. Berks county, Mr. McGowan, not present. Blair county—absent. Bucks county, Mr. Wambold.

MR. WAMBOLD: I don't know that I have very much to say. I suppose this is the Chairmen's meeting. I have conducted an Institute for several years in Bucks county and I have no complaint to make about the lecturers you have sent to us. We make them be

have while they are there and we have them satisfied because we feed them well. On the other hand, we sometimes have a little trouble with our local places that we hold in; there seems to be some misunderstanding by these local places in regard to the amount of money they get. It is often put up to me that the State pays \$12.50 a day and they want \$12.50. I say, "My good friend, my expenses come out of this," and I have been conducting for \$100.00, 10 days of Institutes in one county and have made the path a little smoother for the County Chairman in regard to distributing those Institutes for them.

I believe that if every County Chairman in the State was willing to give twelve days instead of eight, the county would be much more benefitted by it, and I am working for that end, and I do not believe in just selecting a certain place for holding an Institute; I believe in distributing them. I had quite a time until I could alternate these Institutes. For instance, take the upper end of Bucks county, two days Institutes out of the eight; I have managed so far to give the upper end four days and alternate that in four different places. That is getting into a section, taking the upper end, dividing that into two sections and alternating every year, so that it will be a new thing in the district every year, and also in the lower end, and I feel that while our attendance is not quite as large as some other counties boast, the lecturers who have been in the county I think will agree with me that the interest taken in the Institute in our county has been good.

I do not believe very much in the question blank; I believe in the questions being asked right on the floor when the thought is in the mind of the asker, and I try to impress that on our people. In the way of advertising, I never have any trouble to get our programs printed a week ahead of our Institutes in any of our local papers, and a description in the advertising matter. The only trouble I find in those large bills is that they will be hung up and some farm sale notice underneath; if we could have some sort of placard and post it in the windows, I believe it would be an improvement on that, and keep it right before the eye of the farmers that come to that store. I know that the merchants will be glad to have the placard in his window.

Another feature I have introduced in the Institutes in Bucks county which I feel has created a good sentiment amongst the farmers and has improved the conditions of the different things—we have had just a little corn exhibit. I find no trouble in getting into our local bank and saying, "I want \$5.00." I don't ask them to give us \$5.00, I say I want it. We are going to have a Corn Show for this Institute and we want to offer a few prizes. Last year, holding the Institute at Sellersville, I simply asked the banks there and they both said "sure" and some of the merchants said, "I'll give you a pair of gloves" and others said, "I'll give you a pair of something else," this or that, and the very day that we had the prizes awarded, I got a check for \$10.00 from a man who formerly was from that locality and said, "You place it wherever you think best," and in all we had about \$25.00 without any soliciting of the prizes, and the year before we had that kind of an exhibit and I must say that the exhibit of that corn has improved wonderfully on the year before. It brought about the selection of better seed. We had

Mr. Campbell there one year to give us a talk on that line and called on the exhibitors to give us their experience, how they raised that prize corn, and in that way I think our community has benefited by it a whole lot. It cost the State nothing for that. I think if that was practiced in other counties—for instance, I am going to take up potatoes next year; I don't think it is well to take up the same thing every year and I don't think the Department has any objection to such things in our system. The lecture on that topic will be discussed during the session.

The CHAIRMAN: Mr. McGowan, of Berks county; you were out when your county was called.

MR. MCGOWAN: Mr. Chairman: I don't want to appear critical at all, but I believe that if we have thoughts and don't express them properly, they'd better not have been expressed. I have been thinking about a suggestion I wanted to make in reference to the length of some of our lectures that we have to deal with. Brevity is the soul of wit, and I believe it would be better for the hearers at our Institutes if some of the lectures were shortened quite considerably. The alarm clock brought out that remark; and also the suggestion of Mr. Dorsett, that we should enter into the spirit of the Institute. Now I noticed at several of my Institutes that the audience is generally very critical along these lines, and what I say I say in all kindness, and that is the indifference upon the part of many of the speakers, unconsciously to themselves. For instance, the reading of periodicals in the presence of an audience on the part of the Institute speakers is an indication that they are not sufficiently interested in the success of the Institute, or the writing of many letters—which may be supplied for the reporters. I feel that if this must be done, it would be better for the success of the Institute that the gentlemen retire and read their papers, not in the rear of the room and not in the presence of the audience, but at the store or some other place so that it might not show the indifference that it does.

Now lengthy sermons spoil congregations; and as an illustration, this fact came to my mind just recently, only a few days back. I am connected with a church at which our minister was in the habit of preaching fifty minutes. He was away for a time and we thought if he returned we would kindly tell him about his lengthy sermons to save annoyance. Another man was sent there, gave us a sermon in twenty-three minutes, and I went to him and said, "I appreciated the discourse, first, from the fact that it was brief, and second from what you said." "Well," he said, "when I took my church, the minister had preached forty-five minutes. He wound up with empty benches. When I took the appointment, my sermons were from twenty to thirty minutes. I left to come here to you people with a full house." I heard a gentleman get up at State College and he said, "Well, folks, now I do not intend to tire you with a long discourse; I learned my lessons in brevity when I heard a certain theologian get up and say, 'If I can't make any converts in thirty minutes, my case is hopeless.' So I really do believe, friends, that we can learn very much right along these lines.

We want co-operation for our local people, and with a more brief outline, right to the point on the part of the lecturers, we can get the co-operative thoughts of the hearers and blend them together with a great deal more profit than to consume too much time with a long discourse of fifty to sixty minutes. I have had lecturers come to me and say, "Well, McGowan, I can't possibly get through with this in less than fifty minutes," and we have three speakers, possibly. You see the length of that time; and I have found that to press them to anything short of that did not seem very agreeable. So this alarm clock suggestion prompted by making to you these suggestions, not in the way of criticism, but I believe it will work out a great deal better if we boil down things to the point. I was recently connected with a little campaign; every man was limited to ten minutes and I was wonderfully surprised at what a great amount of information could be given in the time of ten minutes. Mr. Chairman, I offer this in all kindness and I believe that we can do some good right along the line of brevity.

The CHAIRMAN: Mr. Louis Piollet, of Bradford county. Be as brief as you possibly can.

MR. PIOLLET. I understand that this session is for the Chairmen of the Farmers' Institutes to know their duties and what they are to do, not as we understand, but what the Department wants us to do. I have already received blanks for calling a meeting in June of the different Agricultural Societies and people interested in Farmers' Institutes, asking them to come to the Court House to select places to hold the Farmers' Institutes. We are to have four Institutes in Bradford county, two days each. The people are interested and want the Institutes. They have already spoken to me. They want one in Raysville, one at West Franklin, etc., but we are going to wait until June and let them come to the Court House and select them altogether, and we will select the places to hold those Institutes in different parts of the county that will accommodate the farmers best. I have had some experience in Farmers' Institute work, as I was a member of the Board a number of years ago, during the time of Mr. Edge, and I have hauled Brother Seeds, John Hamilton, old man Calder and Ex-Secretary Critchfield and many other men over our county to Farmers' Institutes. Now I suppose it is the duty of the Chairmen of Farmers' Institutes to take these men as they come to us, entertain them and deliver them to the place of meeting; that is what is expected of us, whether we should do it or not; and the \$12.50 a day spoken of is used up before you know it.

Now some of the lecturers this morning spoke about the rigs, conveyances, that they were hauled in, that it was rather beneath their dignity to ride behind an old plug of a farm horse. Well we cannot all have the best rigs, but nowadays the automobiles are coming in and I believe they can be transported in automobiles, maybe. I was going to say that during the winter season at the time we have the Institutes, I have gone through snow drifts and taken blizzard weather to meet these men and carry them from one end of the county to the other, which could not be done in an automobile.

I believe it is the duty of the Chairman at a Farmers' Institute to make out the program for the different places that you have selected, to choose in that locality a subject committee and have a chairman among them, that they are to look after the things at that one Institute; and the Chairman of the county, it is his duty to be there and to conduct the meetings. I believe in making out a program that suits the people you are going to talk to, the people you want to reach in your county. In our county, Bradford, it is largely dairying, and we need a man who knows how to talk dairying. If it is a potato county, we need somebody who knows how to talk about potatoes. If it is poultry, we need somebody who knows how to talk about poultry. We have all those things in our county, but especially the dairy industry is what people want to know about. I am in favor of having two or three men from the State that you can choose and fill up the balance of the program with local talent. I believe that the evening sessions should be devoted to educational topics and to domestic economy, and that we should have one good lecturer to speak on that question say for three quarters of an hour, then the rest of the evening to be filled up with entertainment by local talent, recitations, songs, etc., and in years gone by, when I worked at this thing, I never had any trouble to get a crowd and people were always ready to come out, and I believe that if every Chairman will do that, he will make a success.

The CHAIRMAN: Mr. Piollet, I think perhaps you misconstrued the remarks of the speaker with reference to its being beneath their dignity to ride in a buggy; I don't know who made that remark.

A Member: I would like to speak a word in behalf of the man who spoke. I think I was with the gentleman just at that time. He of course had in mind a particular trip we made, I think he referred to that and I think I was with him on that trip. We walked about a third of the way, it was mountainous and we walked about a third of the way, and the reason we walked was because those two horses were too poor, too skinny to pull us. Now the speaker had that in mind, I am quite certain.

The CHAIRMAN: Well, perhaps we'd better thresh out a little further the duties of the Chairmen in looking after and going with the corps of lecturers. It seems to me, where it is absolutely necessary and important that they should attend each Institute in the different sections of the county, that they should not lay too much stress and put themselves to too much trouble to look after the transportation to and from these locations, of the lecturers. I would suggest, of course, that the proper way for them to do is to—

MR. PIOLLET: Take care of themselves?

The CHAIRMAN: Not be dependent entirely on the County Chairman, as they have too much to do, that they do not expect too much personal attention from the different places. The next county is Cameron. Mr. Heilman is not here. Next is Carbon; Mr. Leinhard is not here. Next is Centre; Col. Woodward has gone. The next is Chester, Mr. M. E. Conard has gone. Next is Clarion, Mr. J. H. Wilson.

MR. WILSON: I am from a county not known for the best roads in the country. We have no trolleys and it is sometimes a little difficult to move from one place to another. But I have always been pretty successful in getting a pretty good rig to take the lecturers and I look out for those rigs and hire them before the Institute comes, and in advertising the Institute, I order plenty of programs and mail one to most all the prominent farmers around where the Institutes are to be held, and I visit the merchant there and tell him we are going to have an Institute and give him some programs and we always have a pretty fair turn out in our county. And I must say that we never had a bad speaker; I will say that for the Department, we never had a bad one, never had one that didn't give satisfaction. And in making out the program for the Institute, I always visit with the local committee and have them to select the subjects that will most interest the people of their immediate neighborhood, and in that way our Institutes every year have been improving. I think our attendance has been much larger the last year than it was the year before, and the year before that it was larger than the previous year, and our people are more interested and I think the Institutes, as they are conducted now, are doing a great deal of good and the people of our county are satisfied.

The **CHAIRMAN:** Clearfield county—Mr. Way is not here. Columbia county—Mr. A. C. Creasy.

MR. CREASY: I haven't any report to make, as I am a new man in this work and I came here for the purpose of learning all I possibly can and I have received considerable information and for me to sit in and take the place of our former member, J. P. Young, I am afraid I will have to have that alarm clock started over me. He did successful work in our county and made the Institute a success. I will guarantee this—I will do all in my power to make the Institute a success in our county.

The **CHAIRMAN:** Crawford county, Mr. W. F. Throop.

MR. THROOP: Mr. Chairman, I have only been associated with this work a short time and have hardly any criticism to make. My troubles with the lecturers have been small, not to any great extent. They find fault with me, say I nearly freeze them to death. I believe our Director of Institutes had something to do with the weather at that time of the year. The Institutes in part of our county, there is a large section that it is impossible to get there by rail or trolley and we have fifteen miles to drive. The time of the year when the Institutes come there is the worst weather we have. It has always been a question why the Institutes will start in the southern part of the State in good weather and work up to us in bad weather. The weather in the northwestern part of the State, up until the middle of January, we have practically good weather; from then until the last of March, the weather you might say is something fierce. If they are going to continue the Institutes there in February and March, the only thing I would ask would be that you send me a lighter class of men to haul. We had considerable of a load last year; we only had one light one in the bunch. When you come to haul about a ton around, you must have a good team.

In regard to advertising, we have no trouble up there in advertising. It has been my practice in the two years I have been in, to take the Institutes to a part of the county where they have never been held. Whether they have been successful or not, I don't know. Our attendance last year I believe was 3,600 for eight days. I considered that that was very good for our county, and I question sometimes whether the idea of having some of these lecturers a part of them, coming back to the same county the next year—I credit the attendance in the two years past to the lecturers we have had. One incident: One man on the program was a horticulturist and I had the hardest time with that committee to have him on the program at all; they said, "We are fifteen miles inland, what do we want with fruit?" I believe after Mr. Fassett gave his talk, he was one of the most in demand of any of the speakers, and I believe it did a wonderful lot of good, making that whole trip over there fifteen miles through the storm.

The CHAIRMAN: Cumberland county, Mr. Ferguson.

MR. FERGUSON: I recognize that the problems differ with our counties. We have heard about the transportation of speakers; we have no trouble in that line. We can reach all our points by automobile, and also with regard to our hotels, we don't have to sprinkle the instructors with cologne after they have been to one of our hotels. When I became a manager, the Institutes were held in Carlisle, Mechanicsburg and Shippensburg. The result was that there was just a handful of men about the town that had nothing else to do, who attended. We took them out into the country.

In regard to advertising, we have no trouble along that line, the people come out. We get in touch with the school teachers and distribute programs in the school and we have the community enlisted in our interest. In regard to the long speeches—you notice my brother spoke about the sermon—I suppose that is true with the layman; it was first the brief sermon and then the good sermon, the short thing, whether it is good or not. We have tried to break up this speech making and have encouraged our men to interrogate the speakers, announcing at the beginning of the Institute that if they had a question, to break in at any time, and the speakers have encouraged that sort of thing and I think they will bear testimony that there are a good many farmers with the interrogation point in Cumberland county. You have no trouble with the length of the exercises, when you can have questions and give answers, because there are a good many farmers that know just as much about some of these practical things as the man who is giving the instruction, and it gives him an opportunity to confirm what has been said or to interrogate the speaker in regard to his reasons for the position that he holds.

And Mr. Director, it seems to me that the great problem that is before you, the great responsibility is in the selection of the men who go out to teach. I have been a school director for twenty years. I felt that the great obligation on me was to select the teachers. If you could get the right kind of a teacher, the problem of that school was fixed for that year, and that is true of the Institute work. If the Director can lay his hands on the right kind of teachers, why this problem of Farmers' Institutes is largely solved. I think it is the

great work in agriculture today. There are a few of our boys getting to State College; there are a few of the men go up there to Farmers' Week; they are interested in State College; may more of them go and get the benefits that go out from that institution. But the great mass of men in the rural districts, the uplift that comes to them along agricultural lines comes from the Farmers Institutes. And what we want, Mr. Chairman, is a larger appropriation. I could locate twice the number of institutes that will be given in Cumberland county, and that is what we want, and if we had more money we could make more places.

I want to say just what Brother McGowan has said in regard to the attitude of the speakers toward one another. For them to be disinterested, reading the newspaper or writing a letter or doing anything of that sort in a session the effect upon that audience is not good. They had better remain in their hotel, or at least when they are at the Institute, show an attitude of greater sympathy with the work. We Chairmen need sympathy to go around from session to session and hear the same talk and the same jokes, and for these men to spend two or three months in listening to the same thing day after day and night after night, I have a great deal of sympathy with them; but it seems to me that in order to press upon an audience the importance of that session of the Institute, every member there who represents the State should be an interested spectator, listening and seizing every opportunity he has to help along.

Just one word more, Mr. Chairman, and then I am done. I am glad of the opportunity to be associated with this work of the Farmers' Institutes, the men whom Mr. Martin had, through these years, selected out to do this work, men of knowledge and men of character and men of inspiration and uplift and a blessing to every community in which they go. And among the precious memories of the years that have gone by have been my associations with these men and I think we want men who are interested, not simply in agriculture but in rural conditions. We want to boost this work of agriculture at the Farmers' Institutes. (Applause).

THE CHAIRMAN: Col. Woodward, of Centre county. I just call your attention, Colonel, to the fact that we are trying to hold them down to five minute speeches as near as possible.

COL. WOODWARD: You must somewhere have heard something of my reputation; they say I never made a five minute speech in my life and cannot do it.

THE CHAIRMAN: Well, we will take a chance this time.

COL. WOODWARD: I apologize for being ignorant of the subject under discussion, as I just came in this moment and sat down. I infer from the few last remarks that I heard made, that the subject is the work of the Farmers' Institutes; Mr. Ferguson, what were you talking to or at or on?

MR. FERGUSON: The Farmers' Institute, from the standpoint of the County Chairman.

MR. PIOLLET: I thought you were a County Chairman.

COL. WOODWARD: I am. The point of view that the County Chairman gets of the Farmers' Institute is a quite different one from the view that any other man connected with the work does get. The itinerant speaker, of whom I had the special honor to be one for a great many years in this State and some other states, does not begin to get the view of the work that the man is Johnny-on-the-spot does. He does not know the needs, as the local man does, of the Farmers' Institute, and the Director who selects the speakers, does not know the needs and never will. Mr. Director, I am not discouraging, I do not mean to discourage and never will, as the man who is living in the district and sees the farmers from day to day and night to night, does know them. Now I wish I had heard my Brother Ferguson's remarks all through. I am pretty sure I should have agreed with all he said. I know that I agree with the final remarks he made, but the impression oftentimes comes to me that there is weariness among the farmers of the similarity of the work that comes to them through the speakers who come from year to year, and that there are occasions at least, speaking not of my own locality more particularly than some others of which I have knowledge, that sometimes they wish that there might be some change.

I have nothing to suggest; I know of nothing better than the course that has been pursued, but that impression has come to me possibly through the audiences with which I am most familiar, the localities with which I am most familiar in my own county. Sometimes in thinking it over, I have attributed the appearance of that thing in my own county to the fact that we are too highly favored by sitting under the drippings of the eaves of the great agricultural college. We see and know and hear in our county almost constantly of the teachings, of the work, of the doings and goings-on at the College, and becomes familiar with it, get an idea of it, a great many more of us, farmers' day and farmers' week and all the other occasions that happen there. We are proud of our Institutes, glad of our Institutes and are entertained by them; go to them very frequently and hear and know more of them possibly than those localities which are at greater distances, and this feeling that I have detected sometimes in our own audiences in Centre county was due to that fact, that we were familiar with the things that come to us through the Institute workers more perhaps than others who are further distant from the college and have less of that that is going on there. It has not occurred to me to suggest any improvement or any change; I don't know that I could suggest any. I have not thought it was worth while to undertake to suggest any.

The CHAIRMAN: Delaware, Elk, Erie, Fayette.

MR. WITTKORN: (Delaware county). Our county is largely becoming suburban, so we now have nothing but millionaires and suburban people and that makes the work of the Institute rather hard. We only have a small fringe adjoining Chester county, where we can hold meetings. There was one criticism called to my attention in the last few years, the apparent lack of courtesy between the speakers. I think that if they used the back part of the hall to read the newspapers instead of the front, it would possibly give the audience a better impression.

The CHAIRMAN: Fayette, Forest, Franklin, Fulton.

MR. RANCK: (Fulton county) Mr. Chairman: We are an agricultural county, no manufacturies, mines or railroads, and it is a very difficult county to get over with a Farmers' Institute. We have no way of travelling except by teams or automobiles, and automobiles are rather expensive over the kind of roads we have. But the interest in Institutes is gaining. Last year we had a fair attendance, but it was interfered with very much at one point by scarlet fever in the neighborhood. The other one was fairly well attended considering the bad weather. The interest is gaining, although we are under difficulties that perhaps no other county has to contend with, and that is the way of getting over the county. To come in at one end of the county and go out the other is about 40 miles. We have been having the best kind of lecturers sent to us and people appreciate them very much and the interest is gaining and I always want a continuation of it and I think our people will be much benefitted by the Institute.

The CHAIRMAN: Greene, Huntingdon, Indiana, Jefferson—Mr. Cowan is here, I believe.

MR. COWAN: (Jefferson county). I have no criticisms to offer of the speakers who have been sent to our county, and I have made an effort ever since I have been County Chairman to take personal supervision of the entire work until last year when I was unable to do so or attend any of the meetings. I do not know whether that was the reason or not, but I have never received as many letters of encouragement from the people in the neighborhood where the Institutes were held as I did last year, while lying on my back in bed, sick and unable to read or even to write. A neighbor did what little writing was done and we kept him busy, and after the meetings were all over, I received a number of encouraging letters and inquiries trying not only to get the Institute there during the coming season, but to get the same speakers back, so they have not discouraged the people in the neighborhood. We will very likely take one of our next Institutes at one of the places where we held a meeting last winter; they had never had an Institute there before and were very much pleased with the speakers sent out, and one of the places where we had held an Institute before, they said they never had a better corps of speakers in the county than they had at that time, and I hope this work will continue.

So far as transportation is concerned, getting them from one point to another, we do not have it always flowery up in that country either. I see Brother Menges here and he was with me one time when we had to cut out some of the meetings, for instance up in Knoxdale, he was appointed there and we were way at the other end of the county. These meetings had been placed previous to my becoming Chairman and the Department at Harrisburg, with the assistance of the previous Chairman, seems to have no difficulty at all in finding places to place the Institutes, but it requires about 100 miles of travel to get around to those places; it took two teams from the delivery barn to keep the men moving and there wasn't much time to talk. Many other difficulties along these lines have become memories. We have no criticism to offer in regard to the Department or the speakers they send out.

The CHAIRMAN: Mr. Matthew Rodgers, of Juniata. Please be as brief as possible.

MR. RODGERS: I wish I was like Col. Woodward and could make a five minute speech; I can't talk that long. I am like Mr. Harman—never made a speech. I think, Mr. Chairman, that the whole thing, or a great deal of it, depends on the Institute Manager of the county. If he is a man that will get up and go to work and keep his people interested and informed of what is going on, he doesn't have very much trouble getting an audience. That is one of the difficulties we have—we get too much audience. I think I will have to quit advertising quite as much as I have been doing. Some of the speakers who were with us last year remember how we had trouble and the breaking down of the building; the crowd we had in was so great that we had to just open the aisle and keep officers in case a fire or anything would happen.

We advertise and we get ready; as the speaker over to the right, Mr. Wilson, said, We get lots of programs printed, put them in an envelope and mail them, not only to the substantial farmers but to the ones that are not substantial. We want to get the man that is not a good farmer out, if we can. The good farmers will come, but we want also to get the man out that is just learning how, and after we get the audience there, it depends on you, Mr. Chairman, and the Department of Agriculture, to send us men who will keep the audience under control, give them something to think about, that have something to say. There is one place in Juniata county where they won't stand a long talk, they will put you off the platform themselves, and we don't want very much of it, we want you to boil down your talk. We have had a number of men that repeated and repeated and went on—it is the boys that do it generally—we try to make a short program, as is necessary; we do not want to load the program, and then we discuss the subjects. We have a long county and a very narrow one. You can stand on my farm and see both sides of the county, you cannot reach it though unless you have very long arms, but we have a 20 mile ride—if Mr. Scraggs was here, he could tell you, either a 20 or 30 mile ride, on a very cold day, no snow on the ground but an open wagon and the thermometer below zero. But we get the speakers there, and speakers who have been with us and were not satisfied with the treatment they got in our county, I want them to stand right up here and say so.

The CHAIRMAN: Next is Lackawanna county, Mr. Horace Seamans. We have a very important program for the remaining part of the afternoon; this co-operative market proposition, but we do want to give the Chairman of every county an opportunity to be heard.

MR. SEAMANS: Mr. Secretary and Mr. Director and County Workers: In Lackawanna county we have had Institutes and Institutes; sometimes interesting and sometimes I have thought otherwise, though I sometimes get the blues, and I suppose that when I get the blues, why perhaps I think that Institutes are not up to standard. But usually we are very fortunate in our speakers that we get in Lackawanna county. Last winter we were exceedingly fortunate and I think we had the best Institute there we have had in the last five

years, so that after the Institute closed sometime I received a notice from the Department that I had got to get out and hustle for the Institute in the county, that it didn't seem to be up to the average, and it kind of hurt me across the stomach and I felt rather sore for several days but I think I will get over it. Now, in the northeastern part of Pennsylvania we have a good many mountains and a great deal of land that is waste land. It is not thickly settled; the land is not as nice as it is around Reading; and the inhabitants are not so thick and some have a long way to go to an Institute. This was why the attendance at our Institute last winter was very attentive and why I thought the Institutes were better, very much better than usual.

Now, to illustrate that: Two weeks ago yesterday I attended the Pomona Grange in Lackawanna county, on the Pocono Mountains. Twelve of us got in the automobile and started from the railroad station to go to that place six miles away. We got about half way there and the lady said to me, "That's a deer." A deer jumped out in the road. Where deers live the inhabitants are not apt to be very thickly settled. It is sparsely settled there and I was very much surprised when I got to the place to see only one house in sight of the Grange Hall and I thought there wouldn't be much of a meeting. But I was more surprised when we had our dinner and 120 sat down, showing that they come from other parts of the county that were more thickly settled and they were trying to help out, for the Grange was a new one.

Now what to say or what to offer in this work, I do not know. I am getting along to the time of life that I am satisfied with most anything, and I guess I will not criticise.

The CHAIRMAN: Lancaster county, Mr. Bruckart.

MR. BRUCKART: I must confess to being one of the younger County Chairmen; I am only two years old. I will say, though, that I had some experience before as a county institute speaker and I have observed some things and learned some things now by experience, and the way I understand it, the scope of this Institute work, the way it is put up by the Department. The object is to reach the greatest possible amount of farmers, benefit the greatest possible amount. In order to do that, we have got to try and get them into our meetings.

Now, when I took charge, I found fairly good institutes in our county, but I started with that object in view and I have still got that object in view to fill the halls, especially in the daytime. The evening meetings generally can take care of themselves pretty well; we want to get the farmers there during the day. Now, it may interest you to hear how I started, because it was a success. We had two days less last year than the year before, but we had an increased attendance, and after I was appointed, I first made it a point to meet the different local committees that had been on duty in different parts of the county. I set a date and went to their places and met them, and when I came there I found local committees with lists, some of them a foot long, and when these men did not come, three or four or five came and met me and we

made out a program of those men that had interest enough to come, and I used them for my live wires and then we revised this local committee list and found out there was a good deal of dead wood in there and trimmed that out. Men were on there who were in various callings of life and were not really farmers and did not even honor the meetings scarcely with their presence. We cut them out and got on a good live committee in each district where we had Farmers' Institutes and then appointed ladies on committees, called them the domestic science and needlework committees, and got them interested.

We should get the ladies in these Institutes, because if you get the ladies, the men must come, they will make them do it. And there is another reason why we want the ladies in, and that is this: Now these State lecturers, they are, as a general thing, good men, but do you know that, as a rule, they are great admirers of the fair sex, and if you get them in there at those meetings, it puts them on their mettle and they will do better work than if it is just a stag party; they will do a whole lot better work, they will get right down to hard tacks and show up to their best advantage do better work. I hope you will make a note of that and wherever we have those ladies' committees, we have our best institutes and so we have been working along that line.

And now about the posters—do you know I think that the poster has about ceased to work; it does not seem to bring results. I get in touch with our local papers and they give us these notices that the Department sends out, notices that I write out; and, by the way, I find this to be the case, I have got to do that work myself; if I leave it to the local chairman, it may or may not get done. I know that in one instance when I got down to the meeting the programs were lying there, had not been put out, so this last year I got all those programs and went to the local committee and helped them make up a program, took the copy home and had it printed. and about three weeks before the meetings came off, I took half a dozen of those programs, put them in an envelope and mailed them to each member of that local committee, distributed them all through the session and told them they should put them where they would do the most good, and that is a very good way of advertising your meetings, because the people will read this program, get it out and talk about it. They talk about it and get interested and get their neighbors interested and come to the meetings.

Now one word about these lecturers. I know the Department makes changes from time to time and uses the best material they have got. Last year we were unfortunate, one of the best speakers could not come and they wanted to be very kind to us and sent us three young men from State College, men that did not have any experience. I am a State College man, I have got a boy in school there now, but that was a little too much, it might do in some communities, but it did not do so well in our community because the Lancaster county Dutch like to have men who have had the practical experience and can come and give it out from their own experience. and if you can send us men that can talk Dutch or talk United States, that is the kind we want, men that can put it right there in a reasonably few words.

Now in regard to that time limit, about the speaker, putting the alarm clock on; you know that is difficult for this reason, a man may have a short speech and fall short. A man may have a subject that he cannot possibly handle in twenty minutes, he cannot do it, and so long as that meeting is interested and asks him questions, holds him up and gets information out of him, I do not like to pull down on him. Of course we have got to do it eventually, but I say we have got to make a little distinction, you have got to be elastic and not be too much to the point. Thank you.

MR. J. ALDUS HERR: Can I, as an ex-member from Lancaster county, give a few suggestions?

The CHAIRMAN: Certainly, we will give you two minutes, if possible.

MR. HERR: First, I would say shorten the program; don't have so many subjects, and when you have a good subject that you are interested in, finish it. Two subjects in half a day or one session are sufficient. Then again, send the man to the district who is familiar with the customs of the community. What right have I, as a farmer of Lancaster county, which grows tobacco and feeds fat cattle, to go to the northwestern part of the State and tell that man how to farm, when I know nothing about his business? (Applause). We have not had a solitary man except one professor from State College to tell us how to grow tobacco, and we have had about two men for 9 years, while I was Chairman, who could tell us how to feed beef cattle. I think the Institute has done us a lot of good and I did all I could for it; but your programs are too long and, with all due respect to the speakers, many of them come there and are not competent in the community where they are talking—I will be frank with you. Now we have had elegant speakers and speakers who knew their subjects, but it has been my lot a few years ago when I was in the dairy business, for a gentleman to get up and discuss the topic of pure bred sires at the head of a herd, and I asked him this pointed question, "What kind of a pure bred sire have you?" He says, "I never owned one." Gentlemen, that kind of argument will do no good in our county. Give us a practical man, a man who can stand up before this audience and tell you, "I am doing it to-day, come to see me and I will show you;" I am from Missouri. (Applause).

The CHAIRMAN: I think your programs, Mr. Herr, as I understand it, are usually made up by your county chairman and the responsibility for your program absolutely rests with your local people. We are getting along very slow. We have three addresses this afternoon, one by Mr. E. B. Dorsett, of Mansfield; one by Mr. S. W. Funk, of Boyerstown, and one by Mr. Howard W. Selby, of Philadelphia, that I think you will all enjoy and which we are anxious for you to hear, and I would like for all the subsequent speakers to confine their remarks strictly to the question and cut down the time to two minutes and then they will perhaps get through in five. (Laughter). The next county is Lawrence, Mr. Doris L. Fulkman.

MR. PIOLLET: You ought to set the example for the Chairman of the Farmers' Institute; you have got a watch; why don't you call them down? When I was chairman of the Farmers' Institute and a man talked over his time, I would call him down and I would do it again.

MR. FULKMAN: As I am a new member of this Board, I do not think it is fitting for me to take your time and tell you how to run county institutes, and I think I will just give my five minutes to somebody else.

The CHAIRMAN: Lebanon county, Mr. Edward Shuey.

MR. SHUEY: I am not here to make a speech at all. I thought that this meeting of the County Chairmen was to give us information about what to do next year. But so far it seems to me it is more an experience meeting than anything else and we did not get any new suggestions as to what is to be taken up for the next year.

I have not asked the Department for a special anybody at all before this, whoever they give us we were satisfied with in Lebanon county, and I think every speaker that has been in my county was satisfied with the accommodations I tried to get for him. We know that we cannot give them all they would like to have, but we accommodate them the best we understand and know how to do, and about the publishing of the Institutes, I have been in the work ten or twelve years and I have tried different ways of making announcements for the Institutes. I get our county papers, the daily and weekly papers, to announce the whole program, and one time we had a movable school at Jonestown four days; I went myself and got the programs printed and then went to most of the schools in the two townships and gave the teacher a program for every family in that school, whether a farmer or another family, so that every family in the district got a program a week ahead, and that was the smallest attendance we had in the county since I have been working as a county chairman, and then I said "It is no use spending so much time for advertising and sending out programs to the different committees, that they shall carry them out and get it published in the papers and put up the posters as they are sent, and that is all I am doing and I think it is all that is necessary, but I learned by that experience that if you go too far, you will spoil the whole thing.

Another question comes in there about the attendance. It just happened that those four days were the beginning of December and they were bright and nice and warm days and every farmer wanted to work at home to get his work out of the way for the coming winter, and that had a great deal to do with it, and so I have had no new work, only in regard to the program; some said cut it down short. I say put three questions or four for every half day and get your man in the Institute to ask questions, and as soon as they don't ask any more questions, that man ought to stop and not stand there for a quarter of an hour and talk yet when there's no questions asked, when the people are not interested any more; as soon as they stop asking questions, that man ought to stop and be done and let the other one have a chance.

The CHAIRMAN: Lehigh county, Mr. P. S. Fenstermacher.

MR. FENSTERMACHER: Everybody is starting as a new member; new chairman. That reminds me that I am getting to be an old member, pretty near quitting time. I remember the speakers when I started out as chairman, Col. Woodward, they talked on roads, schools, dairying—I won't make a speech—the question of hall rent also came up. We are paying too much for hall rent. Is it possible, if I could get people or a location where they won't demand any hall rent, is it possible to have two days more of the Institutes?

The CHAIRMAN: It is just a question of money; our appropriations are limited now, and we could not promise it now.

MR. FENSTERMACHER: If I could get a definite answer, I could cut out the hall rent business altogether by guaranteeing them two days more Institutes.

MR. FIRST: We would have to find out how one expense would compare with the other. If we should give you two more Institutes, it might cost a whole lot more money than the hall rent.

MR. FENSTERMACHER: Two topics are sufficient for half a day's session. The attendance is measured by the state of the weather, in Lehigh county. Altogether, the speakers are all right, we have no complaint to make. I try to make them pay their transportation from institute to institute; am I right? Must the Institute speaker or the Chairman pay the expense of a conveyance from one institute to the other?

The CHAIRMAN: Why, the Chairman has been doing it.

MR. FENSTERMACHER: Then they had reason to kick and kick me hard, because I did not do it on several occasions. In regard to advertising, we have no trouble in Lehigh county; I never spent a cent on advertising. I am a friend of every man in Lehigh county. They say, "We always get some news from Fenstermacher;" and when I have something I want published, they will do it. They give me all the advertising I want and no questions asked.

The CHAIRMAN: Luzerne county, Mr. J. E. Hildebrant.

MR. HILDEBRANT: We all tell so near the same story, each has a little different way of working out our plans and our interests. I worked a little different than some of the rest. We meet, of course, the second Tuesday in June and when we meet, and the gentleman comes to the courthouse and asks for the Institute, I want him to substantiate that he will take interest enough to write it up and see that we have a successful Institute, and then I try to have for Chairman, the man who is best acquainted in the location and takes an interest and choose the subjects that would be of most interest to his people, and if the speaker that is sent to us is not adapted to our county, the same as the brother here has

referred to, I have taken it up with the Director and I think that is the place to rectify that, the Director and the County Manager, and I think the Director should rectify it and send me a man who can discuss the subjects that interest our locality. I don't want a man to talk tobacco or poultry, because we have had so many failures in poultry and I don't care much for the statistical gentlemen; we have got State College men in our part of the State and they are full of that, but we want practical men who can tell us how to do it and prove that they can do it. The lecturers have to bear and forbear. If I can't bring out a rig that is quite as good as some others, they have to forbear with me and I forbear with them. But we have had very good lecturers, I can go further and say we had good ones not only last year but year before.

The CHAIRMAN: Lycoming county, Mr. B. F. Kahler.

A Member: As Mr. Kahler is not here, can I have two minutes?

The CHAIRMAN: Yes, sir.

A Member: About five or six years ago we had an Institute in our township and the seating capacity was about 450 and we not only filled that hall but chairs filled the aisles. We had nearly 1800 people at the five sessions. The point I want to make is this, we all know there are a lot of farmers in each community who are in for anything that will help them to the detriment of everybody else. If everybody is to be benefitted, they are not for it; but there is always in each community one or two men who have a little breadth, who realize that one man cannot be prosperous without some of that prosperity leaking through on the rest. There was one of these men who took that in charge and not only called up every farmer that had a telephone in the community and told them about the Institute and invited them out personally, but talked with them on the road. The suggestion I want to make is this, that if each county chairman will sort of put it up to one man in each community and find the man that is a little broad and say to him "I depend on you to make this Institute a success," I think that will help a whole lot to get the people out.

The CHAIRMAN: McKean county, Mr. E. A. Studholme. Mercer county, Mr. W. C. Black.

MR. BLACK: Mr. Chairman and Gentlemen: In my thirteen years as County Chairman of Institutes in my county and in most every instance attending this round-up meeting, when I have found occasion to say the word, someone rose before me who said what I have thought much better than I could say it. I do not propose to consume much time to-day. I think our Institutes have been a very great benefit to us in Mercer county, I am quite sure they have been to the County Chairman. One of the chief benefits has been the development of more gall. You can ask Mr. Dorsett, who, in his closing address at one of our meetings, said the County Chairman took occasion every twenty minutes to tell him he was boss.

The CHAIRMAN: Mifflin county, Monroe county, Mr. F. S. Brong.

MR. BRONG: I feel that there is other work waiting that is more important than anything I could say, and therefore I forbear.

The CHAIRMAN: Montgomery county, Mr. J. H. Schultz.

MR. SCHULTZ: I object in the first place to the way we are told to print our programs. I do not think we ought to print the programs and the Institutes of one county on one sheet of paper. I believe that each Institute ought to have its separate program, for this reason, it is a means of getting the people out to the different Institutes. I want that program by itself, and then I want the Executive Committee, the Committee on Music, the Committee on Arrangements and I want as many peoples' names on that program as I can find to spread it all over the different sections. Then after that program is made up, those people feel honored because their name is on the program, they feel a certain amount of responsibility for the success of that Institute; they get notice that they are looked upon to see that the people in their particular section come out to the Institute and I think it is more economy if we do it that way than the other way. The only way we can figure economy is when we make a success out of it.

Another thing, by having that program printed in the local paper where that Institute is, that editor feels himself responsible, to a certain extent, for the publication of the news of that Institute, and I use it in that way to get in personal touch with the editor. He gets a little something out of it and he does more for you. Then I cannot understand why the people here object to the long program; I want the long program. If we go down into this dining room and have only two things to eat, we don't enjoy it very much, we want a variety. You don't want only a certain class to come at a certain Institute, at a certain session, you want all the people there at every session, and in order to have them and instruct them, you must have a variety of subjects. I can tell you in what condition I was this last season, I had three men allotted to me in my section, which was all right and would have been enough, but there was one man on that list I didn't like to have, not on account of the man, for he was a good man on his subject, but we are not in a trucking section and I had had him there before and the people blamed me for it and I objected to the Department and they sent me an extra man, a good man, and then it was all right; I had four men. I thought when they sent me the extra man they would withdraw the other man, but they didn't, I guess they couldn't, consequently, I had four men and put them on the program for the same session and that is where I put my foot in it. At last I threw up my hands and they ran the Institute.

PROF. MENGES: I didn't run your Institute. (Laughter).

MR. SCHULTZ: I feel positive that if we have short talks and talks to the point—you don't want to tell a man everything, you want to give him a chance to question you; if you learn the lessons for your child, you won't do the child any good. Let your man

point things out, impress them on the people and that is the way to make a success, I think. There are other things that have been mentioned here and I cannot help but say a word on them also. I think that the speakers on the platform ought to have respect enough for the audience not to sit there and open the morning newspaper and read it right before the public. Now those things we are supposed to tell at the Farmers' Institute. This is not said in any spirit of criticism, and those people, I can see their position, they hear those talks day after day, week in and week out, and they get sick of it and want some change, but I think it is far better if they withdraw from the room to read their papers.

The CHAIRMAN: Montour county, Mr. J. Miles Derr.

MR. DERR: Ladies and Gentlemen: It seems to me that we Chairmen this afternoon are taking a rather pessimistic view of our work. I think we ought to be a little bit more optimistic. I don't see that we have any reason to complain quite so much about our meetings. I was Chairman six or seven years ago; I think I had the best meetings and the largest attendance I have had since I became Chairman. My attendance has not been so large since that, not because I am getting old and indifferent at all, but at that time we had a good place to hold our meetings in, a small borough in the center of the county, three churches there, and we had an attendance of as high as five, six and seven hundred people at a meeting. I have had a whole lot since where we have had anywhere from 25 to 50.

Now I can tell you just why we cannot hold our Institute at that small borough since that time; about 5 years ago we had an old gentleman at one of our meetings one evening and he was full of funny stories and he displayed himself and his story told rather too freely on the platform and some of the members of the council of that church were old maiden ladies and widows who were over pious, and from that time on we have not been able to get those churches as meeting houses. I do not blame any of you speakers for that, because the speaker who made that blunder is not with us today; he has gone to his reward. I do not feel blue about that any more. I was assured a few days ago that we can hold our meetings in that borough; I think we ought to do a little smiling. There is not a single lecturer there but what gave us pleasure and they are welcome to come back there.

In regard to getting attendance at the meetings, the further I go away from the county seat, the larger the attendance will be. When I go to Whitehall, 14 miles away from the county seat, I can get the church, a large, commodious building, and get the hall filled. I offer prizes at times to see who will bring the largest load there. We had one load of sixty some people, school children, and all of them brought on one sled. With these few remarks, I won't take up your time, but I think you fellows have had a larger attendance in the past year than the previous year, therefore we have no reason to complain. Try and increase the number next year.

The CHAIRMAN: Northampton county, Mr. C. S. Messinger.

MR. MESSINGER: There was a lot said that it is not necessary for me to repeat. I think we had the best Institute last year we have ever had. Our county is connected by trolley and railroad system from one end to the other. We make it our business to hold these institutes, if possible at one of those lines. One question I would like to ask here—Mr. Fenstermacher said, “Are we expected to transport the speakers from one place to another?” And I believe that was answered yes. Do you mean that I shall transport the speakers from one Institute to another by rail or only by conveyance from the station?

MR. FIRST: That means that you meet them at the railroad station and convey them to the hall.

MR. MESSINGER: It was not stated that way.

MR. FENSTERMACHER: I didn’t ask that question.

MR. MESSINGER: He asked him, “Am I to transport the speakers from one Institute to another?” And the Chairman said, yes.

MR. FIRST: The Bulletin gives you that information.

The **CHAIRMAN:** By way of explanation with reference to that matter, as there may be some misunderstanding. as I understand it, the lecturers pay it by trolley or by rail. If you have a livery rig, you pay for the rig and send your bill into the Department.

MR. MESSINGER: I understand it that way but the question was not answered that way. I also want it understood that we hold our Institutes at places where their coats don’t smell of the cow stable after they go away. About printing the posters, I think that the Department ought to print those posters for each section complete. Now they are printed in a skeleton form, sent to us, we send them to the printer and pay about as much again as it would cost the Department to print them and send them on to us to send out. You don’t want me to take your posters as you send them, write in my old farmer’s way, the names of the speakers in those posters, and their places and the subjects, etc. We have to get them printed. Now I believe, as was stated this morning by one of the speakers, that we ought to have a little more mail communication with our members, such as postal cards and letters, printed complete, so as to simply write on the address and send a special invitation to the different people throughout the county. We had a very hard section to get our people to the Institutes. Whether they do not know it or not, I don’t know. Now, as far as the rest is concerned, I would have a good deal to say. I am no young man in the work, although I am not one of the oldest; but so much has been said that I do not want to take up your time. I want to thank you.

The **CHAIRMAN:** Northumberland county, Perry county, Philadelphia county.

MR. CLARK M. BOWER (Perry county): We are always glad to have the Farmers' Institutes in Perry county. I attend all the Farmers' Institutes. The trouble is we do not have buildings large enough to hold the people at some of the sessions; and I want to thank the Department for sending such good men, they are always welcome. We advertise the best we can in the papers, but they turn out and I send notices to school teachers and have them announce in their schools for the children and parents to come, and they are doing a good work. I cannot say too high words for all the speakers that are there; sometimes I am afraid we expect too much of a State lecturer; sometimes we think a common school teacher ought to know everything and answer all questions. They are only human, but they have served the district and the county very faithfully and the people asked to have them back at the next institute there next winter, so if the State will give us more days, we will surely find places for the lecturers.

The **CHAIRMAN**: Pike county, Potter county.

MR. CRITTENDEN: Mr. Chairman, I have no fault to find and no criticism. The speakers have done fine who have been sent to our section. I have tried to do the best I could for them.

The **CHAIRMAN**: Schuylkill county.

MR. JOHN SHOENER: During my seven years of Institute work, I have tried to reach as many farmers in Schuylkill county as I possibly could. Those who are acquainted with the physical geography of Schuylkill county know that we have a broad mountain and a lot of valleys. and it is a large county and it takes some time to cover the entire county and reach all the farmers. These Institutes have been held for thirty years and still I am sure that one half the farmers in Schuylkill county have never seen a Farmers' Institute. The attendance may not be as great as in some of your larger agricultural counties, for the simple reason that the farmer would have a greater distance to come. If you take those Institutes through the boroughs of my county, I would have a larger attendance, but it seems to me that too much stress is put upon a larger attendance, and I would rather have a dozen or twenty-five interested farmers than three or four hundred children and people that come there for amusement. I know that we are doing good work and that the work has paid dozens of times where we have an attendance of only twenty-five or fifty, and those lecturers who have been doing our county can bear me out.

Now in regard to the advertising, I would have those posters sent out around sections where the Institutes are to be held and then I would have a number of programs printed, which I would send to the public schools and have them sent to every family in that community or near around.

The **CHAIRMAN**: Snyder county, Somerset county, Sullivan county.

MR. G. E. BOWN, (Sullivan county): As I am practically a new man at the wheel, I do not feel as if I had very much to say. I do not care to be hauled off the floor, never have been and don't

want to commence now. I would like to say that in my short experience, the instructors sent to us have been general; I have had no use for an alarm clock or anything of that sort. We heard this morning something about transporting the gentlemen. As you know, Sullivan is a back county and not the best with either railroads or electric roads. I want to say to you that with the mercury standing at twelve or fourteen below zero, taking some five hours to make eighteen miles, there isn't anything funny about traveling there.

The CHAIRMAN: Susquehanna county.

DR. E. E. TOWER: They commenced on five minutes and got down to two, and I thought it would probably be all out before it came to me. There are just two little things I want to speak of; one is in regard to the time the Institutes ought to be held. I see no reason why the Institutes cannot be held up in the northern part of the State in the earlier part of the season and then work down through the State. As the season grows colder, it is almost impossible to get around that part of the northern tier of counties when it is so terribly cold and we cannot get a crowd there as we would if the season was in a little different shape. In the earlier part of the season we will secure a great deal larger attendance. My Institutes last year were not up to standard, for the simple fact that I only went into the business three or four weeks before the Institutes were held, and was told they were advertised and I afterwards found they were not, consequently I do not like to take all the blame for the Institutes.

Another thing is in regard to the speakers. It seems to be there should be a better understanding between the County Chairman and the Deputy Secretary in regard to the wants of certain localities. Nobody is to blame for this, because a man who lives in Harrisburg cannot possibly know the conditions of the counties up in the northern tier and what those people want, unless he has been there. Now there was no County Chairman in that end of the State.

MR. FIRST: Do we not say in those circulars that you should specify the kind of topics you want taken up?

DR. TOWER: You certainly do.

MR. FIRST: And in every instance where we get that information, we try to furnish that kind of a man. If you don't tell us that, we don't know what you want.

DR. TOWER: I do not wish to get up any argument at all on this; but I have made that request and we have varied them up in that end of the State and I don't know when we have had a practical dairyman there. Of course the conditions are so very much different down in other parts of the State where they are doing a larger kind of farming than up there, and those lecturers should be changed and give us somebody that understands the dairy business up there. I don't say this in any complaining way, I say this as a matter of improving the conditions, and the County Chairmen will bear me out.

The CHAIRMAN: Tioga county.

MR. C. H. De WITT: Mr. Chairman and Gentlemen: I don't know that I could add anything to what has been said. We are a pretty good feeling lot of fellows up in Tioga county and it takes a good deal to ruffle us. I have had Brother Hutchison there with me and we have had some glorious good times, and I tell you, Mr. Secretary, they did us a wonderful lot of good. They have been invited to come back, and that is the best evidence in the world that they have given good satisfaction.

Mr. First asked a question of the last speaker there, and I want to say that with me he has always been very kind. He never has sent a poor man into our county. I have always tried to make out the list and send in to him and he has been very fair with us up there and always sent us good men. One thing he understands and the Deputy previous to this has understood, that Tioga county wants him to send practical, experienced men. We want men up to their jobs and don't want anything else, and we have always had them.

I tell you, Mr. Secretary, there is one thing I want to say while I am on my feet, it may be a little bit to the point. There are some men who go out and purport to lecture to our people who ought to be at home looking after their own affairs instead of telling the people how to do certain things. I will call to your mind—just bear with me a minute, I don't want to take up any more time than I ought to—a certain man in the southern part of this county came up into some of the northern counties—this I know to be absolutely true—he wanted to see a certain lecturer's farm, he wanted to see his stock; he hired a livery rig in a certain town, he went out to see this stock and he went out to see this man's farm. He asked the livery man, "Do you know where he lives?" "Yes, sir, I will take you up there for \$2.00." "All right." He drove him up and he stopped at a certain place and said, "Here is the farm." "You don't mean to say that here is the farm of this gentleman?" "Yes, I do, this is the place." "Do you know that this is the place?" "Yes, sir, I know that this is the place. You needn't ask any more questions, I know where I am, I always lived here; I know this place." Said he, "Drive on." "Ain't you going to get out?" "No, I've seen enough."

Now, as Chairmen sometimes we have those very things put up to us. That very thing has been said to me. Now, the fact of the business is that I never have been imposed upon by any of that class of men, and Mr. First has always been kind to me—and the Deputy, in sending us good men. We have got a good deal to be thankful for, to think we have got men as capable as they are to come to us and talk to us, and we have had good attendance and grand, good things and they have done us a lot of good.

The CHAIRMAN: Union county.

MR. J. N. GLOVER: I just want to second what has been said in regard to the shape of the poster; I would like to see the shape. size and color changed every year and I would be glad if they would print on them the names of the speakers as well, and when they send out any document, I wish they would send vouchers to us. For three different years I have had to write to the Department and

ask for vouchers, and I am getting tired. In regard to speakers, I have been at it for sixteen years and I attended Institutes for seven years more and I want to say that the tone of the lecturers has improved, we have more practical men. Years ago I used to suggest to the Department that I did not want any tired, retired or theoretical men, and now I think they are giving us practical men. That is what we want. We have a good class of farmers in Union county and it takes a good farmer to come and tell us how to farm better than we are farming now, so we haven't any use for a man who cannot make good in his own community. We have always talked along the lines of production. Why should we produce more to get less for it? I think it is time to talk about how to distribute to make more money out of what we produce. If we cannot make more dollars out of our farms by doubling our crops, what is the use of doubling them, simply for the railroads to haul? Let us talk along that line.

The CHAIRMAN: Venango county.

MR. H. C. CRAWFORD: I have never held a Farmers' Institute, therefore I do not feel capable of advising on it.

The CHAIRMAN: We are now getting up to the most favored spot in the State of Pennsylvania, Washington county—is Mr. Paxton here? Wayne county; Westmoreland county; Wyoming county; York county.

MR. BARNES, (York county): We had an attendance last year of about ten thousand people. So far as posters are concerned, I don't care if they don't send us any. I use them out of courtesy to the Department. We have had an elegant set of speakers at all the Institutes ever since I have had charge of them in the last twelve years. We try to furnish places suitable to accommodate the greatest amount of farmers and their families throughout our county. We do our part and are blessed with everything in our county except gas and the Department has furnished a good lot of that.

The CHAIRMAN: Gentlemen, we have devoted quite a lot of time of this session of the Institute in order to give the Chairmen of the different counties an opportunity to be heard. As I said or meant to say earlier, when I first opened the session, to me this is the real important session of our Normal Institute. The others are instruction and entertainment brought in by outside speakers in addition to our own lecturers. This is your meeting, and for that reason we have devoted more time to it than we perhaps otherwise would have done.

I want to call your attention—it seems to me there were one or two remarks here to-day that might have been considered in a more serious sense than should be, inasmuch as it has been referred to at different times and reflections have been both ways. The attention of our lecturers has been called very frankly to some things that they have been doing that are not altogether satisfactory to the hearers, as well as to the Chairmen under whose control they were at that time, the matter of reading newspapers and things of that kind in the presence of the audience; the remark of one of the

speakers about his treatment at a hotel and the facilities for transportation, etc. I do not think it was intended in any way serious and I sometimes feel that here on one or two occasions there might have been some reflections cast upon those who made those different remarks.

Now with reference to the work in the future, I want to say that you can all be quite an advantage to the Department of Agriculture. The success of our Institutes, the number of sessions that are held in different counties, the kind of speakers we get and the interest we can stir up depends largely upon the amount of our appropriations. I think you should all keep in very close touch with the members of the Legislature from your different counties and make a special effort to get them interested in that phase of our work. With an increase in our appropriations for this work, we can undoubtedly increase the effectiveness of the service.

With reference to the different kinds of speakers that are sent in to the different localities, you all have heard, what we heard repeatedly, of the diversified interests of our State. Mr. Herr mentioned the fact that they had never had a man experienced in the matter of growing tobacco sent into Lancaster county. You all are aware that the growing of tobacco is confined to a very small section of the State of Pennsylvania, and in order to be able to send a man down there to talk on tobacco culture, it would be necessary for us to get a man from that county. But we shall endeavor at all times to send a man into your different sections, your dairy sections and others, who are practical and experienced. I hope as soon as we get settled down after this Normal Institute, to visit the homes and farms of each of our lecturers, and for that reason I am anxious, as has been mentioned here by Mr. De Witt, I believe that we ought to have men address the farmers of this State, who are putting into practice what they are preaching. In addition to that, I may go further and visit the homes of some of our County Chairmen; I want to know that they are enthusiastic in the work and that they are representative citizens, which I know they are, and know also that they are what they feel they ought to be.

Now I want to call your attention to this address to-night of Mrs. Morgan. She is very highly spoken of and I hope you will have a good attendance and that every member here will make it a point to be present and hear this instructive talk, as we expect to have a piano here for her demonstrations. We hope at that session also to give an opportunity to Mr. Seeds—all of you are very familiar with his lecture; he has only asked for ten minutes time. I had fully expected to give him the time in the forenoon or afternoon session, but it is now growing late and we will devote the remaining part of the session to the program for the afternoon. The Chairman for the afternoon session is Mr. McCallum.

MR. WATTS: Unfortunately I made a remark this morning in reference to the matter of the transportation of the speakers and also referred to the hotel accommodations—I am the man that said it, I don't deny that and I am not here to retract anything; I simply think this, that all of us, in order to get through life properly and with the respect we ought to have, must observe a degree of decorum and cleanliness and neatness that will command the respect of the better people around us. I used to market butter to

fifty-five families in Clearfield, and when I went down there to market the butter, I had been clearing land, rolling logs, handling the cradle and in the winter time cutting wood and my hands were rough, but I washed them the very best I could, parted my hair in the middle and cleaned up and took my butter to the market that way because it helps a man in his business to keep clean, at least, and I have never spent an hour idling around the corners in Clearfield county in my life. I never went to town, as a boy unless I went on a particular message for my father or mother, and when the errand was done, I went home. It does not add to a man's dignity to sit in a little grocery store and swap stories; neither does it add to his dignity to ride in a vehicle that is not right. I am not one of those kid glove fellows; I swing the cradle and all that, so I don't want you to misunderstand what I meant. I know that in one of those few cases it was quite unavoidable, I think so, at least, and the gentleman is in the audience; in the other case it was not and the man said he didn't care. He is not a chairman to-day, he is not as capable as some of you men who are chairmen to-day. I am not retracting anything.

(Mr. M. H. McCallum takes the Chair).

The CHAIRMAN: Ladies and Gentlemen: We have come to the last topic but one, and it is not the least of what we have had. We have been producers in the past, but we find there is something more to do than along the line of production, and that is the market end of the business. I am not going to take a minute's time, but will launch into the topic by calling for the first speaker, Mr. Dorsett, who will open the discussion.

MR. DORSETT: Mr. Chairman, Ladies and Gentlemen: Inasmuch as there are two speakers yet to follow me, I have concluded to boil my two hours' speech down to about fifteen or twenty minutes and let the other fellows have at least a fair share of the time which is left. I presume you are aware of the fact that the Department of Agriculture has undertaken to do a work that was referred to by our brother from Union county, and we ask you, as Institute workers and as members of the State Board to assist in this great work. I will, in order that I may keep my promise, endeavor to read a few thoughts along this line. I do not often do that, but I think safety first is a good motto at this late hour.

Mr. Dorsetts' paper was as follows:

BETTER MARKETING FACILITIES

By E. B. DORSETT, *Mansfield, Pa.*

The State's Duty to Agriculture

How far the State shall go in aiding any trade, calling or profession, is a question that is occupying the minds of all thinking men and women. Our state has many varied and important industries. None of them independent and all of them dependent upon Agriculture,

the greatest and most important of them all. So great and far reaching is this industry that were its wheels blocked for a single day all others would either be crippled or hopelessly paralyzed. We have only to turn the pages of history to learn that whenever a nation neglected her agriculture her downfall began; and what is true of a nation is true of a state. We determine the wealth of a state by the fertility of her soil, her industries and natural resources and the character of the men and women who till her soil and develop her industries and natural resources.

Agriculture being the one industry upon which all others depend, the one which makes it possible for vast numbers of her citizens to live in large cities and industrial centers, where lucrative employment may be found, it is important that the State should render such financial assistance as shall be needed in promoting her growth and extending her usefulness to all her citizens.

Legislation which seeks to foster agriculture and make a just and equitable distribution of her products, is not class legislation, as it benefits the entire citizenship of the state. We determine the power and efficiency of a state by the ability of her citizens to render service. This may be military, industrial or professional, and is raised or lowered by the manner in which they are clothed and fed, and by the amount of wages received for the time and labor expended. The best citizens are the loyal, happy and contented ones, who are kept busy on the farm, in the mill, the office or the factory, at wages or returns for their labor, which enables them to provide the necessary comforts for the home and family.

On too many farms in our State to-day, the farmer and his wife are discouraged, the boys and girls are leaving, simply because the returns for their labor are not adequate to permit them to enjoy even the modern necessities of farm life. Again, in too many homes occupied by laboring men employed in shops and factories, want and suffering are found not solely on account of the low wages received, but largely because of the high prices which must be paid to feed and clothe their families. Why these two extremes? The answer is that the system of distribution has become too expensive and needs changing. The State should seek to improve the system, rather than attack the men who have built it up. This cannot be done by drastic legislation, or by trying to upset old and established business methods, but can be done by creating a Bureau of Markets, with authority to collect crop statistics, gather information relative to crop shipments, give assistance in grading, sorting and packing, organize and establish buying and selling clubs in small units, teach and encourage farmers to grow and produce the same products, in order to facilitate marketing and ensure better prices; in short, to act as a Clearing House for the farmers of the State, directing the stream of products which flow from their farms, thus preventing, in a measure, market gluts and congested freight conditions. All this could and should be done. It will not require a large expenditure of money but will require keen business foresight and intelligent organization.

The farmer has grown tired of that old saw about making two blades of grass grow where but one grew before. Show him how to get more money for the extra blades and he will grow so

many that there will not be room enough to stack them out of doors. There is but little use in preaching the gospel of increased production, important as it is, when the farmer knows full well that he is not getting a just return for that which he now produces. He is not asking for aims, charity nor special favors, but he does ask that he be given a fair chance and equal opportunities.

The Farmer as a Business Man

How often we hear the statement, "That the Farmer is not a Business man." The statement is false as can easily be proven. He is too busy producing his crop to give much time or thought to marketing it, which is a separate and distinct art of profession. That Philadelphia makes goods and New York sells them, is a well-known fact. There would be as much sense and justice in saying that the manufacturers in Philadelphia are not business men, because they do not sell their goods, as in saying that the farmer is not a business man because he does not sell direct that which he produces.

The State's Opportunity

It is at this point that the State can be of the greatest service to the farmer. The marketing problem is not unlike a great, unmanageable river. Some would control it by working only at the mouth and force all products to flow through definite channels in the large cities. This is the method most commonly used and is the one that has become the most expensive. Others would go to the sources, and examine the water-shed, or the place where the products are produced. They would divert certain streams there to other parts and retard the flow of others until a more appropriate time. Floods are due not so much to too much water as to unequal distribution of the flow. At any time perishable products in season may constitute a flood.

Obviously, the agencies at work among the mountains, on the hillsides and in the valleys, along the streams, are in a better position to control the flow than all the engineering conceivable at the mouth. No doubt much could be done in congested centers to facilitate distribution and reduce hardship. But a state-wide plan which puts producers on the alert to co-operatively avert waste and confusion and market their products in a timely, honest and business-like manner has much to commend it and should be put into operation by the State. It represents constructive work that appeals to the farmers, who are learning that true co-operation does not mean criticism and tearing down, nor the development of class prejudice, but means that all interests shall work together, "All for one and one for all."

The end of the present world war will find all Europe's efficiency organized for the production and distribution of food products. The stern necessities of the nations engaged in war gave a great impetus to this movement, and the success with which the governments have been able to make use of the co-operative societies in assembling products of the grade and quality required for the army has constituted a practical demonstration of the value of co-operation. The new methods, with their savings of effort and money and

with their efficient management, have come to stay. This new system acquired in time of war will remain when peace is restored. The American farmer must be ready to meet this change, or defeat will overtake him. With few exceptions this country has developed no marketing system worthy of the name. Agriculture is almost unorganized and marketing is still on the old basis where waste exacts a tremendous toll. The fact is, that the markets and the financing of agriculture have made but little progress during the last quarter of a century. Improvements have been made in transportation facilities and in a more efficient financial service, but these have not touched the real problem. The farmer is still compelled to use the market machinery, worn and antiquated as it is and with which he had but little to do with installing, to get the products of the farm to the consumer.

Here and there standards for the marketing of certain crops have been worked out, but generally speaking, there are but few standards for the marketing of farm products. As a result of this condition disputes, misunderstandings and bad feeling naturally arise. The problem of marketing, therefore, not only includes the proper standardizing of the product and the placing of it in proper carriers and containers, but it has to do with the transportation, the grading and packing, its display in the city market, the sale of the product and the accounting for the moneys received as well. The common carriers have improved transportation facilities and have in many instances lessened the time in transit, but the method of displaying products in the city market and the cost of selling is still too cumbersome and subject the farmer to unnecessary expenses.

Industrial Organizations Co-operate

The great industrial organizations have learned the co-operation between the different branches and departments is absolutely necessary for permanent and financial success. Agriculture with its many individual producers, occupies a very different position, but the difference is not so great that the farmers cannot profit by the lesson taught through the experience of these great industrial organizations. In foreign lands organization and co-operation are recognized as cardinal principles. One has but to point to the organization of agricultural activities in Denmark, Germany, France and Ireland to bring witness to the truth of this statement. It therefore is important that the farmer should come to a larger appreciation of the necessity for co-operation between the agricultural groups and in each community center. His political views should not be allowed to interfere with the progress of this work. It is not a question of socialism or individualism, of democracy or republicanism; it is a question of efficiency, social and financial betterment.

Working Out the New Policy

Accepting such lessons as have been taught us by the old world, the time for consideration of the marketing problem is at hand. Agricultural difficulties are so far-reaching in their social effects that they must be approached from different angles and inspected from different view-points. It is time for the farmers of a great

agricultural state to study and formulate the principles which underlie the successful expansion of the nation's greatest industry. How can individual farmers work with their neighbors? How can the several Subordinate Granges work with other farm organizations of similar character? How can the many and varied farm interests be correlated so that they will work together systematically and intelligently? The confusion of the present must not longer continue. The answer is to be found in a Bureau of Markets to be under the jurisdiction of the Department of Agriculture and to be managed by a Bureau head the same as other Bureaus are managed. The head of this Bureau should have the authority to examine into the methods of production and distribution of farm products with a view of evolving a system of greater economy and efficiency in handling and in marketing.

To supply instructors and lecturers upon the subject of co-operation among farmers, auditing and accounting experts and legal advice in matters relating to farm organization.

To issue reports and pamphlets and instructors which will help in spreading knowledge of the best means of rural betterment and organization.

To organize and co-operate with all farm organizations, local branches or associations, for the promotion of "better farming," better business, and better living."

To encourage and co-operate with educational institutions, departments, societies, educational centers and bureaus, in all efforts to solve the questions of rural life, rural betterment, agricultural finance, marketing and distribution of farm products and the special application of the facts and methods discovered relative to the conditions existing among the farmers of Pennsylvania and to the solution of the problem of increasing the cost of living.

The possibilities for the usefulness of such a Bureau, both to producers and consumers, are simply immeasurable and I urge this body to ask the next session of the Legislature to make it possible by suitable legislation. Thirteen states already have such Bureaus and Pennsylvania should never be satisfied to follow, but should take the lead in every movement that tends to promote agricultural interests and improve farm conditions.

MR. DORSETT: I want you to get this, fellow farmers, that we purpose to start a series of organizations; it may be the grange, it may be a farmers' club, a farmers' union or simply a company of ten or a dozen farmers, it doesn't matter, but we propose to have them organize and then through those organizations' work, through the Department and in that way keep each other in touch with the market conditions. Here is a letter received last night, and it is so near the point, I want to read it to you:

"Dear Sir: I am writing about an organization and ask you several questions relative to the formation of a co-operative Egg Association. Mr. Theodore Wittman, the expert poultry lecturer, said I was to write to you and said you would give me all the advice I would need to know. Well, the first thing I would like to ask you is this; do you think it would pay us to organize, and if so, would ten members be enough to start a co-operative Egg Association?

And also in what way would you think it best to go about it? Would it cost much to start, and if so, how much? Would you hire a man to sell the eggs and to sort and grade as to size, color, etc.? Would you find a regular selling market, or pay a man to look after this for us? Therefore, hoping I may hear from you, etc., I am,

Yours truly."

Now I give you that letter for this reason; we get a number of inquiries of that character every day. With this Bureau established at Harrisburg, as we hope to have it in the near future, instead of writing direct to me, you may write direct to Harrisburg, and it matters not whether you want to buy or whether you want to sell, the thought of the Department is to put the two together and to give you the information that I know you so much need.

Now we want your help in this; it is a big problem, and don't expect too much. If we had more time, we could tell you more about the market reports we are now getting daily and as to what use will be made of them. I want to say this to you in conclusion; if, at any time, at any of your agricultural meetings, your farmers' club or your grange meetings, I can be of service to you, I will be glad to come and explain this proposition more in detail than I have this afternoon. (Applause).

The CHAIRMAN: Along the line of the market end, the subject will now be taken up by Mr. Sheldon W. Funk, of Boyertown, who will speak to us on "Preparation for Market."

Mr. Funk spoke as follows:

PREPARATION FOR MARKET

By SHELDON W. FUNK.

Mr. Chairman, Ladies and Gentlemen: I believe that this is a very important session this afternoon and I am only sorry that we do not have a little more time to discuss it. I would like to take up some of the questions that I know you people have in your minds along the subject I want to talk to you about for a very few minutes. I will treat the subject just as quickly as I can, and then if there is any time for questions, I will be very glad to take them up.

We have come to look upon the marketing question or the marketing problem as a very complex one, and I believe it is a complex one, but I believe the main reason we seem to think it is a complex one is because we have not studied it as much as we have studied the problem of production, and the time has come, as the former speaker said, when we have got to study the problem. I do not believe that we are going to make any radical changes; the marketing problem has been before us too many years, it has been studied by too many

men and we are not going to make any radical changes to-day. Sometimes the farmer says, "I am not getting anything for my produce, the commission man is getting it all." The commission man says, "I am not making any money, it is the other fellow that is getting it." I do not believe that it is the fault of any one man or combination, I believe we are all in the same boat, we have got to correct our methods a little bit and the farmer has got to correct his. I believe the commission man can do something, the transportation company can do something, the jobber can do something. I know the retailer can do something and the consumer can do something to help solve this problem of marketing. We have all got to do a little if we are going to straighten it out.

I am satisfied if we are ever going to solve the problem of marketing in the State of Pennsylvania, the thing we have got to build on, the advance guard of the whole proposition is better grading and packing. There isn't any man in the world, I don't care how good a salesman he is, that can sell something that is not good or can sell something that the buyer does not believe is good, and when one of you men goes out to buy a horse or you want to buy an animal of any kind, you want to examine that animal and be sure about it, and when a man goes out to buy a barrel of apples, all he can see is the top and the bottom, he does not know whether there is a lot of poor stuff on the inside or whether the entire barrel runs as it is on the top. And I say that until we get some system of grading or packing whereby, when a man goes on the market to buy a barrel of apples, he knows he is going to get just exactly what he sees on the top of the barrel. I cannot see how in the world we are going to solve the problem, and I thoroughly believe that the problem of better grading and packing or that the only way in which we can put the marketing problem on a scientific basis is to establish a better system of grading. Take Pennsylvania, I have visited a great many men and I know there are lots of men in the State that are getting good money for the things they put on the market. Why? First of all, because they have studied their conditions, they have studied the kind of produce they can produce best of all on that particular farm. Secondly, they have studied their market, they know what it wants, what kind of produce it wants; and the third thing, they have become acquainted with their commission men; they are not dealing with a fellow they don't know, but with a fellow they do know, and they are making money, and if there is one man that can make money in that way, there are more men in the State of Pennsylvania that can make money in that same way.

I want to say a few words about the packages. Pennsylvania is more of a fruit producing state than she is of a vegetable producing state, and I am not going to say anything about the packing of vegetables, but I do want to say a few words about the packing of fruit. First of all, apples. The standard eastern package of apples is the barrel; it is the package that the Pennsylvania growers are going to do more with than any other package we have. The box package has not done very well in the East. I think the main reason is because the buyers have not yet gotten confidence in the Eastern apples that are put up in the boxes. I believe there is a time coming when the box apple will do a good deal better, that is, the Eastern boxed apple will bring a great deal more money than

it does to-day, but the barrel is going to be the best package that we have. Now then, in a few cases, I think that a smaller package can be used very well. The hamper works very well in some cases, but the hamper, like the box, is a package, as I see it, that can only be used, mainly be used, for high grade goods and on a high market. I cannot see that we can use the hamper or the box on a low market, such as we had this last season; but there is a chance for a number of men to use a smaller package, something on the order of the chip basket, or even a little smaller or possibly a little larger, a package that you can put up to the consumer, but of course in a proposition of that kind, the grower has got to come in direct contact with the consumer, but I believe there is an opportunity along that line.

As far as peaches are concerned at the present time, we are packing principally in the regular Delaware peach basket, fourteen and sixteen quart basket, Georgia six basket carrier, and in a few cases, the bushel basket. Now in this section of the State I think more peaches are put up in fourteen and sixteen quart baskets than any other way we have. A man shipping on to the New York and Boston market should use the carrier package, because that market prefers that package; and there are certain sections in the State of Pennsylvania where the bushel basket is the best package that can be used. But there again, each man must study out his proposition and find the package that is most wanted on that particular market; and also I think you will find that the bushel basket is the package that works best on a low market, where the smaller package works better on a higher market.

Just a few words about grading. Our fruit should be graded, first because it looks so much better; you can take a bunch of two and a half inch apples or a bunch of two inch apples, we will say, and give them to a consumer and he will take them and he will think he is getting good apples, but you throw half a dozen three inch apples into that basket of two inch apples and you have spoiled the whole proposition; at once he raises a kick; he says, "Why do you have all those small apples in there?" So for that reason it is very important that our apples be graded. And again, it is the only way that I know of that we can put apples on the market and tell the consumer or the buyer just exactly what is in the package. If we do not grade our fruit and grade it down just as close as we can, how in the name of sense is that buyer going to know what he can expect on the inside of that barrel?

Now I know it is a hard problem to grade fruit and a particularly hard problem for you to grade your own fruit; it is so very much harder for me to see a worm hole in my own apple than it is to see a worm hole in my neighbor's apple, a whole lot harder; and I often thought that if we graded each other's apples, we would do a whole lot better. If you grade your neighbor's apples and let him grade yours, I do not believe we would have nearly the trouble in grading that we do have at the present time, but when a man comes to grading his own fruit, it is a different proposition. It is the same way in the thinning business; I can thin some other man's peaches or apples but I cannot thin my own and I do not try because it is impossible, and I think the same thing holds true in grading, but nevertheless we must get down and get some standard grades.

I cannot tell you the names of the grades. We might take the grades that New York State has adopted or we might take the grades that Delaware has adopted, but I cannot tell you whether or not that is the best grade, I do not know, but the name of the grade is not nearly as important as it is to put up a good, honest, careful and uniform pack, carefully packed, uniform package. We have got to put up good, uniform fruit, and just as soon as we people in Pennsylvania, we producers, put up good, uniformly graded stuff, then we have got a beginning. Then at least, we at least are doing our share. Then it is up to the next fellow, but I know, I am positive, that the greatest reason why we have so much trouble with commission men, not the entire reason but the main reason why we have so much trouble with the commission men is, first because we have not packed our goods the way they should be packed, because they have not been graded the way they should be graded. I do not believe that all commission men are angels. I know there are rogues among the commission men just the same as among the farmers and every other class of men, but the farmer that sends goods to the market that are not graded properly cannot expect to get what those goods are worth, because the buyer is taking a chance, it is a gamble, he buys without knowing just exactly what it is; and I do not blame them sometimes if they do not give us as much money as we think we ought to have.

Now then, how are we going to solve this grading problem? How are we going to get the growers over the State of Pennsylvania to grade their apples or their peaches or whatever they are producing? I used to think that one of the best ways in which we could do it would be to pass a grading law, but I believe now that that would be the easiest way out of the problem if we could enforce that grading law but I do not believe in the method most states are using, and that is each state passing an individual law. I believe that if we are going to solve the problem by legislation, the only way we can do it is by National legislation. Now I know we have the apple bill of 1912, but I cannot see that the apple bill of 1912 has done very much good; I do not believe it is strict enough. Then we have the New York State Bill of 1915, the Delaware Bill of 1915 also, right on both sides of us, but a man can pack his apples according to the Delaware State Bill or according to the National Apple Bill. Then again a man buying apples does not know the different grades in each particular state. He may be buying a grade he is acquainted with in New York State and then buy a grade from some other man that possibly is entirely different; he isn't acquainted with the grades, and the only way we are going to solve it, if we do solve it by legislation is by National legislation and make that law just as strict as we can possibly make it. That is one way.

Another way of solving the problem is to send out a large number of expert graders over the State of Pennsylvania and teach the growers. But we do not have the money and I do not believe we are going to do that. Another way is the matter that Mr. Dorsett brought up, and I think that is by a Bureau of the kind he mentioned and then getting the growers in the State of Pennsylvania to co-operate and be able to send a man, for a few days at least, into

that particular locality and let him teach the members of that association. That co-operation will be one of the best and quickest ways of solving the problem. And last of all, we can solve the problem by individual effort, and possibly that is what we have got to do at the present time; let each man study the grading and the packing problem from the ground on up; visit your commission men in your big markets. Why I tell you, ladies and gentlemen, I never in all my life have seen as many poor apples, as much poor produce of all kind as I have seen this last year, and I cannot blame the consumer for not wanting to pay a big price for it and I cannot blame the commission man if he does not get a big price for it. We have got to put up good goods and put them up in good packages and in a good manner.

A Member: Would it pay a Fruit Growers' Association to hire a man to do the packing and selling for that Association? Send him out over the country and let him sell the fruit?

MR. FUNK: Under the present conditions I believe it would be the very best thing the association could do. It has been worked out pretty carefully in the West and it has been their only salvation. If it had not been for their co-operative associations that regulated the grading and the packing of apples entirely, the Western apple man would not be where he is to-day, he would have been done for a good many years ago, and that is the only thing, in my estimation that saved him.

A Member: How about market milk and butter?

MR. FUNK: I do not know.

A Member: Has not machine grading been successful?

MR. FUNK: There is a good bit of kick on the market about machine graded apples; it does not seem to do them any good, and I would answer that question in this way, that it has and it has not. For some varieties of apples, like the York Imperial and Ben Davis, I think the machine grader is the thing, but when you come to a tender apple, like the Winter Born and Ney, for instance, I do not think you would dare use it. It depends altogether on conditions.

MR. FENSTERMACHER: On this question of grading, we never will have the same kind of grading until we have a specialization of this matter of growing different things or producing them, that is, certain sections growing certain things, like they have out in California, then they can have their associations and can all be branded one way and there will be no trouble. With us every man has got his own grade. You may have the same law and the same idea, but they won't work out the same way. That has been my experience. We had a discussion on branding the other day. It is about the same thing in growing fruit; if one section would confine itself to peaches, another to apples and another to nuts, etc., it would be all alike and there would be no trouble.

The CHAIRMAN: We will now have another talk on the business end of this problem, by Mr. Howard W. Selby, of Philadelphia, who will speak to us on "Publicity and Advertising."

Mr. Selby's paper is as follows:

PUBLICITY AND ADVERTISING

By HOWARD W. SELBY, *Philadelphia.*

Your program for this afternoon's session is the most logical arrangement I have found in a large number of meetings. It is devoted to the development of "Better Marketing Facilities," and the first topic deals with the fundamental problem in bettering market facilities. Until the products of the farm, orchards and garden are properly prepared for market you will find the same faulty methods in their distribution and a resulting poor financial return.

It must be assumed in addressing you on the subject of "Publicity and Advertising," that you have now resolved to apply in minutest detail the recommendations made by the last speaker, because, without thorough and proper preparation of your product for the market, you have nothing worthy of being advertised. A fundamental principle in all sane and profitable advertising is truth, and unless your package is truthfully prepared and packed, all expenditures for advertising that product would be fruitless.

Attention has been forcibly drawn in the past few weeks to the series of five great conferences held in as many central western cities. Their purpose was to study the producer (farmer) and his attitude toward trade marked goods, together with other most successful methods of winning his trade. It was declared that the farmer is partial to nationally advertised goods and the merchant who continually stocked his store with such goods is doing an ever increasing business. When a salesman endeavors to sell to the farmer an automobile, a cream separator, implements, fertilizers or seeds he always finds more ready sale for those goods which are nationally advertised. This makes the contract which I wish to call to your attention; namely, that the farmer always calls for the advertised product but makes no effort to place his own product on a like basis. He is willingly and freely contributing to the expenses of placing other lines of business on the most modern basis, but is giving little attention to modernizing his own sales methods.

A great deal has been said recently relative to the value and import of publicity. Publicity might be termed a certain phase of advertising which tends to create a public opinion and sentiment on some particular product or person. It is usually couched in the form of news items when appearing in our press rather than in the columns where we look for the commercial advertising. You read of our great ex-President through the columns of our press and become a believer and follower after the principles which he pre-

scribes. You firmly advocate that others believe as you are converted to believe. Our elections are greatly influenced by publicity, because less than one per cent. of the voters know personally the men for whom they vote; they cast their ballot for the men whom their friends or their party or their favorite newspaper advocate or advertise.

Somewhere just a few years ago an individual in public office conceived the slogan which has been and is being repeated over this entire country: "The High Cost of Living." This slogan received such widespread publicity that it was repeated by every tongue in the nation and has found a large part in molding an influence over the minds and beliefs of the American people. The farmer was heralded as making such enormous profits that young men and older men in every vocation turned to the study of farming. A "back to the soil" movement resulted and to the astonishment of these aspirants for an easy fortune the majority have learned that gold dollars are as difficult (or more so) to produce on the farm than in other fields of industry and the professions. These men who were allured by publicity to the work of the farm failed to realize that publicity was a great factor needed to aid toward making a success in farming. Public opinion is moulded by the press and that which received most publicity is believed by the greatest numbers.

The time was never more ripe for the application of publicity to the building up of the farming business. Newspapers and periodicals everywhere are eager for news pertaining to improved farming methods, for facts which will relieve this stress of the high cost of living, for new ways in which to use the farm products and for improved means of distribution. Let a farmer do the unusual, the progressive, present the facts to the newspapers and nine papers in every ten will publish the story. The news of farmers' conferences has been published in the past two years with considerable detail and with the papers making requests to be notified of succeeding meetings.

Associated effort secures the most advantageous publicity, when the personal element is eliminated and all are working for one purpose. In the past season several successful campaigns were waged in an effort to increase the consumption on apples. An apple day was designated by the International Apple Shippers' Association but their effort was weak in this section of the country. No doubt their experience will prove of greatest value in organizing a campaign for apples in the next winter. With the increasing production of apples throughout the county it is imperative that the food value of apples and the many ways in which apples might be used be continually presented before the housewife and the consuming public. In Philadelphia, for three days in the month of March, an apple show was conducted by an organization of produce men known as "The Boosters," which is organized for the purpose of giving publicity to farm products in their season. At this show every variety of apples on the market was placed on exhibition in a vacant store along the most prominent thoroughfare of the city. Circulars telling the food, medicinal and health value of apples were distributed by the thousands and cook-books telling 197 different ways for using apples were handed to all the ladies. On the final day of the show an apple was handed to everyone who come to see the exhibi-

tion, and over 25,000 apples were given away. The results from such a display and expenditure cannot be directly estimated; but it is certain that a large proportion of Philadelphians talked apples during those three days and it goes without saying that talking apples results in eating more apples.

Last year I talked of a certain brand of Pennsylvania apples to a bank president, and in the season sent him a box of the fruit with compliments. Instead of treating his friends who called on business to the customary cigar, he gave them one of these beautiful apples. This scheme was found so popular that he continued sending frequent orders for the apples and discontinued for the time handing out cigars. His friends inquired where the apples were grown and where they could be purchased, with the result that many orders came from the first box which was sent complimentary. And you would have been interested in the manner in which this banker recommended the fruit and referred the prospective customers. A good product properly packed not only increases the growers' pride but the consumers' pride as well. Every housewife takes pride in serving the market's best offering and every man in treating his friends to some fine high-standard product.

Publicity is peculiar in as much as a slight impetus will cause it to multiply in rapid progression and with wonderful accumulative results. The first box of apples as a gift and matter of publicity was a profitable proposition as it created talk resulting in further and fast increasing sales on this particular brand of apples. Give your product a strong boost, keep "everlastingly at it" and the world or that part you serve will listen to your story and if your product is worthy, the boosting will automatically continue and your business will increase. Your greatest advertisement is a satisfied customer for he will serve as your publicity agent voluntarily and without remuneration beyond continued satisfaction.

In the issue of *The Philadelphia North American* on Tuesday last there appeared an article, nearly two columns in length, by Mrs. Anna B. Scott, calling attention of the readers to the fact that now is the time to eat rhubarb. The low cost of this product was emphasized, together with receipts showing that there are numerous ways in which to use rhubarb aside from a sauce and as pies. The Philadelphia Vegetables Growers' Association has considered securing the services of some eminent physician or chemist and have him prepare articles for publication in season telling the public of the food value and healthful qualities of rhubarb, celery, asparagus, lettuce and various other truck crops. The various associations with such aim are in their infancy but I feel confident that they will in the near future make their organizations effective at least from the standpoint of giving publicity to the products grown by their members.

An interesting experience in our household was about three months ago when a yeast cake was delivered with our grocery order and contained in a neat sealed envelope. On the reverse of the envelope from the advertisement was a recipe for potato biscuits. That recipe was given on the yeast envelope because it called for yeast in making the biscuits. We tried this suggestion, which to our folks was entirely new, and we were delighted with the tasty product. It is

true that these biscuits called for only slight quantities of potatoes; however, I firmly believe that many novel ways might be devised by one employed by The National Potato Growers' Association with the consequent result of an appreciable increase in the consumption of potatoes.

It is the natural tendency in a discussion on publicity and advertising to lean toward co-operative methods and to make recommendations for large associations, because it is there we picture the greatest possibilities. I must talk to you, however, with the thought in mind that a large part of your work is done in sections where the grower disposes of his product in the local markets. When shipments are made to the large city markets for distribution through a commission merchant, the grower or association might think that the possibilities for advertising his or their product is greatly reduced. Such is not the case and I have the knowledge of numerous profitable methods which from their beginning have been inexpensive, modest and profitable.

The Eastern Shore Farmers' Exchange, with offices at Onley, Va., has established a large reputation by their trade mark of the red star. The red star brand potatoes are known by every buyer on the city market and that brand or mark stands forth as evidence that the white potatoes or sweet potatoes contained in that package have met the requirements of their particular association. Individuals in turn from the New Jersey section have in several instances established a trade mark by merely painting the rims of their baskets. I have in mind one grower who paints all rims blue and then stencils his name over the blue paint with black paint. Another grower uses red paint. These two marks have been recognized for several years on the Philadelphia market to designate a high standard product. In many instances the result has been that a premium over the regular market has been secured and in many instances when the market has been glutted these brand selling at market level prices have sold more promptly while other good not trade marked have rotted at the stores. This same methods is being used by an expensive grower of potatoes in the Norfolk section who paints the top rim of all barrels red. This mark carries a certain identification and gives the message that assuring the buyer that the grower of that product furnishes his guarantee of a straight and honest package. I find in every instance where the grower presents his name and guarantee before the buyer that the package carries a certain degree of pride and that the grower is endeavoring to meet the requirements of the city merchants on an honest basis. This fact is realized too by the produce.

Attractive labels placed on each package have proven their value many times over. When the farmer is placing a crate of strawberries on the market or when he is marketing his crop of potatoes or whatever the produce his name should be identified with that product. If the good give satisfaction to the buyer it will mean further sales. In every line of manufacturing we find that the manufacturer claims that the profits lie not in the first sale to any customers but rather in the later follow up orders. It costs money to secure new trade. If the customer is satisfied with the first deal it should be the business of every man to clinch that trade and to secure every succeeding order possible.

Sales of strawberries from Bustleton farms have been made in different sections of the State and to new customers of whom we had never heard but they had found these berries to give satisfaction when they made the purchase from the neighboring store. They would never had known where the berries were grown had the crate not been labeled. The label bespeaks a certain degree of character and individuality.

An experience which I have related on numerous previous occasions is that with potato growers in Lancaster county. A few years ago when soliciting consignments of potatoes in that section, I found certain growers with a good quality of potatoes who were packing them honestly and grading their stock carefully. They loaded sometimes with their neighbors who had an inferior quality of potatoes in order to secure the carlot freight rates, the result in many instances was that the farmers received like returns; the producer of the good stock securing a small return which had been made by averaging his product with that of his neighbor. We suggested to certain of the growers at that time that they take tag every bag of potatoes shipped; one side of the tag bearing this statement, "Grown and packed and guaranteed by John Blank, Peachbottom, Pa.," and on the reverse side on the tag the name and address of the commission house. It was found that this idea interested the growers and stimulated the grading of their potatoes more uniformly. He took apparently greater interest in preparing his shipment because he realized that his name was at stake.

In every line of business we find that the trade mark and the good will are great assets, sometimes the greatest in the possession of manufacturing concerns. I believe that it is possible for the farmer to establish a good will from a trade mark that will furnish an asset proportional in value to that of the manufacturer and probably greater in value than his entire farm equipment.

The CHAIRMAN: This brings us to the close of the afternoon session. Now, I don't want you to forget the evening program. I would like to see all of you here that can possibly be here. We have a good program for this evening. Bob is going to be with us—I mean Bob Seeds—and he is going to speak, and this lady, Mrs. Morgan, comes to us well recommended and we certainly shall have a good evening session. Is there anything more to come before the Institute before we adjourn? If not, I am ready to entertain a motion to adjourn.

(The session then adjourned).

May 25, 1916, 7.30 P. M.

Dr. Hannah McK. Lyons in the Chair.

The CHAIRMAN: I think the hour has arrived, possibly a little more than arrived, for beginning, and they tell us many times that the last part of the meal is always the best. You know sometimes

we like the meat and vegetables best and then again we find folks leaving those and saying, "Oh, I'd rather have the desert;" so to-night I believe we are going to bring you the dessert and I believe the folks who had to go off to-day and could not remain for the dessert, are missing perhaps the best of the feast. At least you and I who are here, are going to think that, and we like the inspiration of crowds, it does mean a great deal when you have a full house and all that, but after all I feel many times that we get just a little closer together in the heart to heart talk when we reach closely to each other and perhaps we do our best work, as the saying is, when we are carrying the inspiration home that we would not perhaps in a great crowd; so we are going to feel that way to-night, too, and we are glad we have a full program and I am sure we are going to enjoy the evening together very much. Mr. Bond, whom you all know as a real veteran worker, felt that he could not remain for this evening; an important business engagement in the morning made it necessary that he go home this afternoon, but he has asked Mr. Stout, of Schuylkill county, whom you all know, to give us just a little brief review of the workers, and so we are going to ask Mr. Stout at this time to give us that. (Applause).

Mr. Stout spoke as follows:

A BRIEF REVIEW OF FARMERS' INSTITUTES OF 25 OR 30 YEARS AGO.

By W. H. STOUT.

Our good friend and brother, Mr. Bond, found it necessary to return to his home on business matters that required his presence there to-morrow, so he requested me to take his place. I objected to it because I cannot take Mr. Bond's place, we only have one Mr. Bond in the State; and while I am a sort of a substitute and started in this work about the same time he did, I can give you some of my experiences that may be somewhat the same as his were; and to-day, when I was sitting idle, a few thoughts suggested themselves to me.

Before touching upon this interesting work, a few introductory remarks will be in order. You know that is fashionable among prominent speakers, to have a few introductory remarks. (Laughter). Now I had to put this down in notes, I couldn't get anybody else to write it, so I had to do it myself, and this is a little hash, you know, previous to the feast that we expect here.

I feel at home here among the staid, steady and conservative Pennsylvania Germans, in what is termed the pie belt, where we have that nourishing delicacy three times a day, and before retiring. It is amusing to associate with such persons as come from other sections where the buckwheat batter is never wanting from October until May and where boiled squash is the one vegetable most highly esteemed. To see those from Prohibition sections advocating free

love and woman suffrage and pose as Prohibitionists at home, devour the good old-fashioned mince pies in the rural communities when the pies are spiced with good brandy or New England rum, is simply surprising. This section is noted for its industries and progressive agriculture. However, while many of those assembled here have not visited Schuylkill county where the most scientific agriculture is carried on in the State, it would be well to spend time to visit the valleys surrounding the anthracite coal field to see work of practical scientific expert farming. Being progressive it is proposed to advance to higher stages in having a county agent employed to tell us more about balanced rations, germs and bacteria. The farm products find markets in Schuylkill county where all the crops are demanded to support the vast army engaged in the mining district where nothing intervenes between producer and consumer except the tail board of the market wagon, as practically everything the farmers produce is delivered from house to house. While generally contented, we meet with afflictions and visits of diseases to which animal life is subject, like hog cholera and aphthous fever, also human epidemics. Over the tail board of the market wagon, we exchange commodities and money, get all the money we can for the least possible goods, and the high cost of living does not enter into the question.

Now on this question of Farmers' Institute work and early recollections, I want to call your attention to a few names that occurred to me to-day as having been among the first engaged in this work. Here we have for instance, Mr. Bond, Mr. Snively, Mr. Heister, Mr. Cooper, Mr. Grundy, Mr. Frear, Mr. Freas, Mr. Waters, Mr. Armsby, Mr. Sisson, Mr. Northup, Mr. Stitzel, Mr. Fox, Mr. Critchfield, Mr. Garretson, Mr. Searls, Mr. Woodward, Mr. Schock, Mr. Philips, Mr. Thomas, Mr. Vallersham, Mr. Campbell, Mr. Tewksberry, Mr. Heiges—these are some of the names I remember as having been engaged when I first started out in this work as associates, and I think that covers most of the speakers at that time. I found out during my experience in Institute work, that people listening to these speakers don't regard the use of high, fluent language, they don't appreciate the use of Murray, Smith, Kirkham and Quackenbos English so much as they do the facts. They are like Dickens, they want facts, they don't care about the English sometimes handed out to them in long sentences.

Now when the Institutes were first introduced, it was under the old administration of the State Board of Agriculture, when Secretary Edge was continued Secretary for several terms and I became County Chairman when they were first introduced in our county, and continued in that office for quite a number of years, 16 I think, and when we first attempted to hold Institutes we did not meet with a very cordial reception. I remember the first instances right in my home town. I worked it up, and when I went into the hall to open the meeting, I saw a few farmers standing on the other side of the way, on the boardwalk, the sidewalk, and kind of peeping out behind the trees, looking across the street to see what was going on, and we had a very slim attendance because of this fact. We had a lot of people who were trading on the credulity of the farmers: For instance, fertilizer agents, agricultural imple-

ment dealers and others who were dealing with the farmers; they tried to make the farmers believe and often said—I overheard it—"Why, we can't learn anything from those fellows, they are only book farmers, they are not practical farmers." They discouraged it for some years, but we spread the gospel continuously and after while we got more interest aroused.

I remember also we couldn't find a single hall to meet in; the church was denied us because farmers objected to having anything in a church outside of religious services, hence we had to convene in any place that we could find. I know of three instances, one in Lehigh county, where we met over a hotel barn, and where the manure had accumulated and was stored down below. At home we experienced the same thing in our county, we could not get any suitable hall, so they put us in these livery stable lofts, and in one instance, we had a similar situation, an open shed; the floor was cold and they brought in some beer kegs from the adjoining hotel and some slabs from the saw mill and made seats for the audience to sit on. Those were very discouraging beginnings. Of course we kept on working it up gradually, and we finally succeeded in getting larger audiences and more interest.

Then the Grangers became active; we had some of those speakers who were Grangers come in there and advocate the Grange. Then they organized Granges, and since then we have had better success with our Institute, but those were some of the discouraging beginnings, and of course we worked it over those fertilizer dealers or agents; they were a problem. I remember the time very distinctly when plain South Carolina rock was sold in my home community for \$24 to \$26 a ton. The analysis showed about 10% or 12% phosphoric acid, worth \$12 or \$13 a ton, just doubled the price on them, and those fellows discouraged the Institute.

I don't want to consume your time; these are just a few reminiscences of the beginning of the Institutes, and you know what their success has been since then. At this time, however, we were permitted to select our own speakers. The County Chairman could pick his speakers for his own Institute and we tried to select speakers for our community suited to the occasion, fruit growing and other things in which we were engaged. We tried to have men discuss those along with a few scientists from the College like Frear, chemists, etc. So that is about my experience, and I suppose that some of you who started in this Institute work about the same time had the same experience. Now we are allowed to go into churches and Grange halls, where it is a pleasure to meet audiences.

MR. FOX: About what time was that, Mr. Stout?

MR. STOUT: That was about 22 years ago.

MR. FOX: Is Mr. Bond here?

MR. STOUT: No, I am a substitute for Mr. Bond.

MR. FOX: Well, excuse me.

MR. STOUT: Certainly.

MR. FOX: I wish to say just one word in regard to the first Institutes. The first Institutes were held in the winter of 1888 and 1889, under the auspices and direction of the Secretary of the State Board of Agriculture, Thomas J. Edge. As Mr. Stout has just told you, the County Chairmen or the members of the Board for their respective counties, were authorized to collect the speakers, and one of the very first that was held, was held in Joel A. Herr's district, in Clinton county, at Cedar Springs. I am very sorry that Mr. Herr has been unable to be present at this meeting on account of illness, but we met there; we had Mr. Nesbitt, of Union county, Mr. Henry W. Northup, of Lackawanna county, and some others, and it was right on the heels of a great storm, a storm which spread over portions of the State. And in going away from Cedar Springs we were caught in that storm near Millhall, and we were soaked to the skin and rendered very uncomfortable indeed. I recollect Mr. Nesbitt going into a store at Millhall and buying a horse blanket to cover himself to keep warm until we got to Lock Haven. We stayed in Lock Haven over night, and when we go down to Watsonstown, to go to Millville, we then learned of the great destruction that had been caused in this very city of Reading. The silk mill was destroyed and between nineteen and twenty had been lost and over a hundred girls had been injured by the destruction of the Reading Silk Mill at Eleventh and Marion Streets. Moreover, the Easton Brine houses had been blown down and the paint shops of the Reading Railroad Company, on the 16th of February, 1889. I, being from Reading, was very much worried, but I was expected to be at Millville and we all went there, and on that night came near having a panic in the Millville Hall, which was over a store.

MR. FIRST: With all due respect to Mr. Fox, we have got a full program and really we cannot take the time for this extemporaneous talk. We appreciate your work, Mr. Fox, but we haven't the time this evening.

MR. FOX: That is right, you haven't the time; I only want to make a remark as to Mr. Alva Agee, whom you all know. We had him announced to speak at Wernersville, and when he came there, there was nobody to hear him, and the reason given was that there was a public sale in the neighborhood and there were 700 pies to be eaten, and, as Albert Hewitt said, it was useless for any Institute worker to try to speak against 700 Berkshire County pies.

The CHAIRMAN: We are now to hear from one whom you are always interested to listen to, Mr. Seeds. (Applause).

MR. SEEDS: Mr. Chairman: I want to thank you for that applause, ladies and gentlemen, because applause to a public speaker is like sicking to a dog. Talking about Community Building, as I said yesterday or the day before, I would liked to have talked on that question for a few minutes after the gentleman had gotten through talking on Community Breeding. Now I did not expect to wait until this hour to get an opportunity to make the few remarks I wanted to make at that time.

But talking about the Institute work—years ago, I guess I am the oldest man in the work now, you understand, as a section man in Pennsylvania. If there is anybody else doing Institute work that is an older section man than I am, I don't know who he is. This thing came about in a very queer way. A few years ago I lost myself, went down to Philadelphia to see the doctors and they told me I had diabetes and I'd better go home and fix up my financial affairs; and I went home and Mrs. Seeds began to talk about what she and her second husband expected to do and I made up my mind that I wouldn't die, and strange as it may appear, I came to this town. On this street, within two blocks of this place, lives the man from whom I bought the old, abandoned and worn-out farm I own, the man who held the mortgage and got the farm at the foreclosure of the mortgage, and I came down here, bought that farm from this gentleman and moved on it that hadn't had a man on it for seven years. Can you imagine the condition of that farm when there hadn't been anybody on it for seven years? Can you imagine what it would look like? Can you imagine Mrs. Seeds and myself moving from Tyrone, out of a home we had built to our own pleasure, with a bath room, toilet room and all the conveniences of a town like Tyrone, and going down on to that old worn out and abandoned farm? Mrs. Seeds cried when she went into that old farm house. She knew what was in that house better than I did; (Laughter) and I am not here to say a disrespectful word about anybody or anything, and when you cannot get the sunny side out of a proposition, there is no use in some of you fellows trying, and I am not here to say a disrespectful word about a bed-bug, but I don't like the way he makes his living. (Laughter).

Now that was the old farm that put me on the Institute platform. That farm began to have a different appearance from what it used to have and Secretary Edge invited me to different places to make speeches. I have spoken at a Farmers' Institute when they brought in the beer kegs, empty beer kegs, (laughter) and turned them on their end and put planks on there to hold the meeting. I have gone into counties when they went down in the store and got the grass out of the crate the dishes were packed in and straightened it out and brought it up and laid it on the desk at the Farmers' Institute and wanted us to tell them what kind of grass that was that was taking possession of their community and cattle wouldn't eat it. They were afraid that grass was going to run them out of the county. I went down to Montgomery county when Mr. Martin gave me the First Section, and the first thing they did was to take me off to one side and ask me what I had done along the line of politics, that they were paying me for doing something for the machine, and they walked away like lambs when I told them that I was a Democrat and there was no collar around my neck and the man did not live who could put one around it. I faced all these things and saw the improvement on every side; I saw the improvement from here to Nebraska along the lines of agriculture, and I have been proud to see the farmer come to a place where he is no longer being called a "Rube," and I am glad to see everybody taking their hats off to the farmers of this country. I think the proudest hour of my life was when I was introduced to 900 bankers in New York City and every-

one had an evening suit on with the same kind of flower in his coat, and I made that duffer introduce me to that bunch as a farmer, and that is the way I stand from here to the Coast. I want them to understand that I am proud that I am a farmer.

That man day before yesterday talked about Community Breeding, and I wanted to follow that man at that time and changed it around and call it "Community Building," because I have been at that all my life, and today, if I was to sell that farm, which Mrs. Seeds cried when she saw, if I were to sell that farm, I don't believe Mrs. Seeds would sign the deed; and I have got six children who would sit down and bawl their eyes out if I'd sell that farm, and I have got a right to say something about community building. At Madison, South Dakota, three years ago, on the Fourth of July, they invited me out to their Chautauqua. I went out and talked to them on the "Mistakes of Life"—on the Fourth of July; and last July they invited me back again and my subject was "The Influence of the Home," and I spoke to the largest crowd I ever faced, on that subject. And without any preparation I stopped talking about "The Influence of the Home" and started in to talk about the influence of the hog pen, on the afternoon of the Fourth of July. Why would I do a thing of that kind? What would make me do it? Simply because I had gone out there to the Chautauqua for the afternoon of the Fourth of July, and sixty days before that time I had lived in a hog pen, spent sixty days in a hog pen, and the reason I talked it was because it was in my system, I had lived it in the last sixty days, and I began to talk the hog pen to those people, and I told them I had built the best hog pen, finished the best hog pen between Pittsburgh and Philadelphia with sixteen departments in it, with sunshine and ventilation that some hogs don't have, with concrete floors and troughs and running water in every department, and I thought I was thinking about putting in individual drinking cups. (Laughter) And I stood there and told the people that I expected that hog pen, with 106 blooded hogs in it, to have an influence on the coming generation in my community, and I meant it, every word of it.

Now, traveling from here to Nebraska, I go through communities out in the West where the people of this country go there and pay tribute to that community because they have been building that community in the past, and I have sat down there and watched men with overalls on make a public sale bring \$26,000. Not only that, but I stayed over there and in two or three days attended other sales in that community and said to myself, "If those people can build a community like that, why can't I do it?" How did they do it? Durock hogs, Berkshire hogs, Holstein cattle. No man ever wore a white collar raising a razor-back hog, he can't do it; there is an eternal fitness of things that goes with all these things, so I made up my mind that I was going to help to build my community by better breeding. I went out to Ohio and I looked around to buy some cattle and I made up my mind that after traveling over this country, that the Holstein cattle had the boom in this country at this time. Now, if Howe was here, he would say I was crazy. I didn't buy the Holstein cattle because I liked them better than any other cattle; I bought them because they had a boom in this country and I wanted to go with the crowd; and you can take any advertise-

ment in Pennsylvania, I don't care where you find it, any company that wanted to advertise anything, they use the picture of a Holstein cow. Show me one, if I am mistaken, showing the popularity of that breed of cattle, not because I like it, but because the people said it was a good thing, and I went out and brought a lot of those cattle in to my community and I turned around and began to talk it. Since that time we have got two men in Huntingdon county and two in Blair county with quite a bunch of Holstein cattle.

What am I getting at? I want the man from South Carolina and North Carolina and down in that country where they want blooded stock, I'd like to see them come up to my community and lay their money down in my community instead of going to Ohio to do it. Now if my friend Howe was here, he would say the Holstein milk ain't fit to drink, it's that poor and thin.

Now we have a cow testing association in my community, and my friend Haggerty, who lives at Arch Springs, has the Jersey cow. I will take my lead pencil, corner me now if I am not right—in that cow testing association Mr. Haggerty's best cow gave something over 800 pounds of milk, and she made so many pounds of butter. But Walter Seeds takes one of the Holstein cows we brought into that country, and she had to give between 1,200 and 1,300 pounds of milk in a month to beat Mr. Haggerty's cow. Now I will acknowledge that Mr. Haggerty's cow produced 800 pounds of milk and made so many pounds of butter, and Walter Seeds beat her by having a cow that produced so many pounds of milk. Walter Seeds don't make butter, but he sells the milk in Tyrone at 24 cents a gallon in the winter time. Which cow would you rather have? If the milk stands the test and can be sold on the market of Tyrone, would you sooner have a cow giving 1,200 pounds of milk or one giving 800 pounds of milk, if you sold it by the quart? Now that is a lead pencil proposition with me, and the lead pencil is what cuts the figure in helping to build up any community.

Not only that—when Walter Seeds has a bull calf that he don't want and takes it to a public sale—I think he sold three this Spring that he didn't want, little calves, at \$50 apiece—you take a cow and she has a calf and you sell it for veal for \$15 and the other brings \$35 more, how much more is that calf worth than the other, from a lead pencil standpoint? Not only that, but I think we have got about 400 head of registered Holstein cattle—grades don't count—and I expect to see the day that one man cannot have a sale. But we will go together, not like this man said the other day, but we will go together and each one put up so many head of registered Holstein cattle and advertise the sale all over the country and have people come from other states, and that is the Community Building I like to look at. I like to see a community building that you can stand off and look at it with your eye and see it—I am from Missouri—and then take your lead pencil, sit down and figure it out and see what it is worth and draw the red line and see where the balance is. That is what counts with me, the figuring.

I wanted to follow that man the other day and talk about community building just for a few minutes. The whole thing is to understand the thing in a right kind of way and get the eternal fitness of the thing; like an Irishman that was going to see an Irish

girl. He went with her for seven years and at last he made up his mind that he would marry her and went over one evening to pop the question, and when he popped the question, his Irish lady-love said, "Ah, Pat, I can't marry you, I am a dispeptic." Pat says, "The divil you are; why didn't you tell me that long ago? I have been going with you for seven years and you never told me that before." She says, "I didn't know whether you were going to ask me to marry you or not and I wouldn't tell you now if you hadn't asked me to marry you." Pat says, "Oh to the divil with it, we can get married and you can go to your Church and I'll go to mine." (Laughter). So there is an eternal fitness of things and that is why I didn't want to give this talk now, I wanted to follow that man the other day when he was talking on the stock proposition. I believe, as firmly as I believe anything, that good stock, registered stock that is up to date, will make better cities, I believe it will make the boys look better and keep themselves in better shape and make a better appearance when they go out among the public. Sure I believe it; I believe it as firmly as I believe anything, and that is community building in my estimation.

I guess my time is up, but I just want to say one more word: Charley Waple, of Tyrone, is selling to the young people of Huntingdon, Berks county registered gelts, all pure bred, and giving those boys and girls a premium of \$25, \$30, and \$35 for the best sow and the best litter of pigs next fall, and I had the cheek to tell the Board of Trade that Charley was doing more than anybody else in Tyrone to build up that community. Is one of those young men going to a shoemaker's shop to get his hair cut when he takes that sow to the fair? Not on your life. He will go to Hollidaysburg and have his hair cut and he will have on the best duds he has when he shows that sow at the Hollidaysburg fair, and I believe these things as firmly as I believe anything, and that is the reason why I wanted to make this speech. I would have talked a little different if I had followed that man the other day, but there is an eternal fitness of things; we are here tonight to eat peaches and cream, and I thank you for your attention.

The CHAIRMAN: Mr. D. H. Watts, of Kerrmoor, Pa., is to talk on the "Vital Factors in Rural Improvements," which perhaps fits in with community building. (Applause)

MR. WATTS: Friends, just a few words before I begin to speak. I feel that it is to be just a few words to preface that I have not written on this paper, and that is from the tone of my language, some of you might misconstrue my intentions or feelings on this subject; you might think perhaps that I am an anti-college man or a kicker, to use the slang phrase, against the higher institutions of learning. You might ask me, although I am not a college man, to prepare a talk or a paper on efficacy of a college education, which I am sorry I do not have, and I would do the best I could to show up for any and all colleges but particularly our own. But tonight, happily, and to my best advantage, I talk to you about the building of the home in the country community, a different theme entirely.

I use a paper tonight for the first time in my life. I have been very busy and am not very ready in committing too memory and I don't know that I can read a paper and look you in the face—I like to see the people I am talking to and I really do not like to listen to a minister any too well who reads his sermons, so you will have to bear with me.

Mr. Watt's paper is as follows:

VITAL FACTORS IN RURAL IMPROVEMENTS

By D. H. WATTS.

While I did not seek a place on this program, I am glad to look into your faces and talk of environs to an habitat with which I am quite familiar. What I say will not be with animosity towards the city life, in fact, I believe there should exist between us, these two classes of people, a reciprocal and altruistic relationship.

Vital factors favorable to and unfavorable to rural development are recognized by all progressive rural people; but how and where readjustment is to be effected is not always first seen by the dweller within the gates, but by the one from without. Seemingly, the vision of the farmer is oft mistified by long acquaintance with his environment and an over conservative nature may hamper his progress. The initial Rural Investigation Commission was appointed by President Roosevelt, upon that board the first place of honor was given to farmer Henry Wallace of the West. Then followed numerous desultory efforts of the city "uplifter" who does not seem to serve as an uplifter greatly, except in prayers of rural folk uplifted to be relieved from the tears of the uplifter; (but that word "uplift" does sound more sweet to the ear of the sluggard than the word "reform"). Well, in the findings of the Roosevelt Commission, we were told that country life needed some readjustment—that the great trio of educational agencies, the home, church and school were out of harmony with the world, needed tuning but no tuner, no panacea or cure-all was applied.

My friends, the home where you and I were born, where the children linger at mother's knee, where they play, eat and sleep, is the great vital factor of any community; next to it the educational plant of the farmer. Let me quote the words of a few of our educators. First, of Dr. Hunt, former Dean of Pennsylvania State College: "I hold that any system of education is faulty that does not permit boys and girls of 14 to 18 years of age to sleep at home, any plan of education that breaks up the home life at this age is not ideal. This has been the contention of the speaker before you for years. I call it rural suicide. And with this home breaking what a sadness and a flood of tears, what an untimely expenditure of money."

Prof. Clinton, educator of Connecticut: "Never will any method of instruction or sending out of specialists bring in a better age for the rural dweller. The farmer may thereby get more dollars, but he

will then rent his acres and move to town to better social and educational advantages. The boy and girl of the farm, has as good a right to these advantages as the city boy and girl; but those community blessings must develope if not bud in the rural environment."

Another Dean of a college says: "The little rural school and its work where I obtained my early training is no more efficient than it was thirty-five (35) years ago."

Hon. M. W. Hays, of Washington, D. C., says: "The little one-room school must become a four-room consolidated plant, so that a man trained in agriculture and a woman in home building, may here find fair wages and a friendly co-operating spirit among the patrons of a school of one hundred to one hundred and fifty students."

This is a brief word picture of a few such schools in Pennsylvania of which I shall later speak. Such as we should possess in numbers to accommodate all the school population, training in a sane and economic way, the 95 per cent. of children now receiving no secondary education. I have looked up the words of more than a dozen educators of large institutions of not only our own State and others and their concensus of opinion is the same. Yet these men are all, mark you, every one of them boosters for their own respective institutions in the United States.

There are sixty-seven State Colleges and fifty Experiment Stations, numerous other colleges and State Normal Schools which are zealously boosted by thousands of school officials and teachers, with millions and millions of dollars of property value and appropriation. In Pennsylvania alone we have a State College and numerous other colleges and thirteen State Normal Schools secured by boosting, and, sometimes, lobbying. From these institutions with all their retinue of itinerant educators bringing seasoned and sweetened fragmentary knowledge we are expected to be patient.

What is the situation after all of this education at the top instead of at the foundation. When I was a small boy 85 to 90 per cent. of our people lived in the country; now but 47 per cent. are on the farms. What have we done? Educated away from the farm. We need the buoyancy of good home grown educational plants. This little sprinkling of distant schooling reminds me of the boy at play who tries to satisfy the aquatic majesty of a goose by playing a stream on his back with an alder squirt gun, he needs the buoyancy of a real home pond. Home institutions are what we want with boosters and lobbyists back of them too, if need be, where the children get the fostering and developing care of the first school years and up through the secondary education as is and has been done in France for years. We are trying to educate all the while without proper foundation and building at enormous cost to the few who are educated—while 95 per cent. of our rural population are devoid of High School education, even a good common education as the fans of ball-field and store box loafers will show; multitudes, if you please, who care little for reading matter and less for learning a trade. This, my friends, is the fruits of our sowing.

Now to a few figures. We have, I am told, 4500 townships in Pennsylvania, and from these, counting six students from each, is sent annually to distant schools at an expenditure of \$300 each, or

nine million (\$9,000,000) dollars. With this goes a goodly sum to common carriers, railroads, etc. Now does this not look like rural suicide? We farmers then pay a home school tax and a distant school tax, a double school tax. We are like the fellow who went from Chicago to Philadelphia to get good distant religion (Billy Sunday kind), his railroad fare was \$50.00, his hotel, \$10.00, and his Billy Sunday fee \$10.00. Yet when he got home his religion was only skin deep; but it cost him more than he contributed to his Chicago church in a decade.

Last fall I happened to be in the town of one of those mobilization camps or schools with its acres of buildings, where hundreds of farm boys and girls are sent and where I spent a few months, 33 years ago. This was in the evening, on a vacation day, and all was quiet, and, luckily, I met at the gate a faithful old teacher who still lingered in the service. She said, "Why, Mr. Watts, I am so glad to see you, and how long is it since you were here?" I said, a long time indeed. She then said: "You have seen this building and that, and that landscape view and do you see the magnificent large five-story building we are finishing over there and you should see the beautiful changes and furnishings inside; come in." Well I went in and saw the place, one of the great, fostered, boosted plants that shelters hundreds of farm boys and girls who do not "sleep at home"; one of the rural suicide plants boosted by a multitude of people, some of which are beneficiaries.

But, who are boosting our little rural schools, our little orphan institutions receiving less appropriation, because of thinly or sparsely settled territory? Oh, yes, some County Superintendents defend the ungraded school in its bramble setting. One recently in a public address said: "Nearly all of our successful business men of city and town came from the little red school house." He is right. But why did he not mention the greater number of rambling inefficiently who emigrated also from its doors; the speaker before you, for instance. I, like so many others, lack that all important fundamental training. Well, do I remember my struggle in mathematics. I came to denominate numbers, concrete numbers, complex numbers and then to confused numbers, and then I quit school. Now, that same man who was lauding the little ungraded schools, said: "Yes, I know twenty-five teachers in one city who are successful; they came from the little one-roomed school." He must have meant to say, they developed finely in the country in spite of the little school. The superintendent did not say, however, that the city and town now decree that they will not hire a teacher until he or she has taught three successful terms of school, where usually in that little experimental school, was the stepping stone and passport to other things. This reminds me of the fame of a certain colored doctor who was approached by a young man of his own race, thus: "Rastus, I say you is de most wonderful doctor I ever saw, you sure never make anybody feel sick or mean or kill them wid medicine." "Wol," said the doctor, "it is this way, I is most wonderful careful of my people and when I expounds and ascribes medicine, I always gives de fust dose to de dog, if the dog comes out allright, den the patient gets it." Those twenty-five successful teachers in the city, gave we farmers the first, second and third dose and then went to the city at higher salary.

Why is it that the farmer naps while our city friends make the school code. (A garment to fit anybody anywhere), makes the curriculums, names the salary, the length of term and the size and scientific qualities of the old drinking bucket, tin cup and stove, and next year how to pack the lunch of the school child. How many men and women in this audience had a hand in the architectural design of our recent school code? Do not all speak at once.

We, as farmers, give up all, trust all to others. Like a bunch of sight-seers in a secluded spot in Yellowstone Park, when held up by one lone highwayman, after he relieved them of watches, money, etc., one thoughtful tourist, a farmer, in a trembling voice, said: "If you are going now, here is my umbrella, you might be caught in a storm."

As a farmer, I for one am ashamed of our inactivity along the line of improvements so vital to our welfare; why is it so? We have a goodly number of rural schools operated to the interest of their people, one such is at the cross roads village of Elders Ridge, Indiana County, a combination High School where agriculture and Manual Training are taught, cooking, sewing, iron and wood working. Think of it, 86 students at an educational plant in a city of houses that can be counted on the fingers of your hands, all getting the very sort of an education they need, and, in the words of Dean Hunt, "All sleep at home."

Now a few figures. The suicide price of a year's schooling away from home is no less than \$300 per annum per student. Then there is saved to Elders Ridge and the nearby townships yearly, 86 times \$300 or \$25,800, which, if added to carfare and incidentals, would amount still much higher in distant education, nearly as high as distant religion.

I have named this one sample school to show what can be done locally. And if I had the power I would return the thousands of the previous boys and girls of tender years from the distant-overcrowded State Normals and Colleges to their rightful heritage; a plant like the one mentioned, where they would enthuse and enliven the home and neighborhood life, would afford an organist in the country church choir on Sabbath morning and fill the old church structure from the door to the Amen corner with the very ones who are now drifting hither and you. Yes, the school and church are Siamese twins, cripple one and you wound the other. Both are vital factors and both must grow and be nourished from within, not so much from imported enthusiasm, however kindly it is proffered. A wise man has said, "He who would succeed must be his own most severe critic." So let us turn the X-rays on our own community and if possible determine what vital factors are being neglected; why the stagnation in the church, the school, the roads.

I should take time to talk about the road from my farm that stretches over the hill to Rambo Lane farm and thence on having no end like time itself. These roads are as important to rural improvement or advancement as the veins of our bodies are to our life. Then why do we so sadly neglect the dirt road? I hope that the day will soon come that the road laws of our State will be mandatory and say you *must* crown your roads on or before a certain

date, not later perhaps than May 10 and you *must* remove the loose stones from the road bed, etc.; simply a passive suggestion is too mild for most of us, and thus the good intentions of our road authorities are rendered abortive. Co-workers are we in our work and touch with the farmer, helping him to build to the community in which he lives, or do we heed only the distant "Macedonian cry" in the distance that is not born of need or distress whereby our rural population is robbed, not only of boys and girls, singly and in pairs, but of whole families in quest of better educational and social advantages. After needed country conditions prevail in the existence of real home grown schools and social centers, there will come in the golden day of rural contentment and efficiency. Then those depopulating and devitalizing agencies that now act as a magnet will have lost their power. Then, too, will come the day for the college to fulfill its true mission in teaching along special lines to the many who having been well grounded in elementary and secondary education at home, now know their talents and bent in life, come seeking the rounding out and embellishing touches of an education yet to be added to young manhood and womanhood, already beautiful by the virtues of rustic beauty and rural honesty. Co-workers, may we do all in our power for the little sparsely settled community that has such gigantic problems to solve, little direct—appropriation tendered and withal has few boosters.

May we all boost the open country interests and the fruitage will be an hundred fold. Yes—this is the message in behalf of the yet innocent boys and girls of the open country who will never hear the tramp, tramp, tramp of the college class or sit among the fans on Commencement Day.

RESOLUTIONS

The following resolutions were read and adopted:

Whereas, The importance of the Farmers' Institutes throughout the State of Pennsylvania has been made most apparent during the present Spring Round-up of the State Board of Agriculture and the Farmers' Annual Normal Institute;

Therefore, be it Resolved, That the members of this Farmers' Annual Normal Institute and State Board of Agriculture heartily endorse the splendid work being accomplished by the Institute Workers and Farm Advisers, and favor greater co-operation by the farmers and citizens of the State in furthering the interests of agriculture in our Commonwealth.

Whereas, The present meeting of the State Board of Agriculture and the Annual Farmers' Normal Institute has been most successful;

Therefore, be it Resolved, That we hereby extend our sincere thanks to the Chamber of Commerce of Reading for the many courtesies extended to the delegates in the Convention, particularly

number of pleasant outings made possible for the visitors to the city, and the hearty co-operation in the arrangement and assistance in the Institute;

To Secretary of Agriculture, Charles E. Patton, Deputy Secretary and Director of Institutes, C. E. Carothers, and Clerk of the Farmers' Institute Division, E. C. First, for the complete and instructive program they prepared, and to the Institute speakers for the valuable lectures and addresses and general co-operation in making the Institute such a marked success;

To Hon. Edw. H. Filbert, Mayor of Reading, and Dr. Frederick Willson, President of the Chamber of Commerce, for their hearty welcome to us, and their assistance in making our stay in the city a pleasant one;

To Mr. M. H. McCallum and Hon. H. G. McGowan, members of the State Board of Agriculture from Berks county, for the splendid manner in which they arranged the details for the Institute, and for their untiring and most successful efforts in providing entertainment for the members of the State Board and the Institute during the delightful stay in Reading;

To Mr. J. P. Hennessy, Vice-President of the Reading Fair Association for his valuable help throughout the Institute, and for his splendid efforts in securing the automobiles for the trip to the Fair Grounds;

To the newspapers of Reading for their continuous support both prior and during the Institute in carrying the importance of the work for agriculture in Pennsylvania to the people of Berks and adjoining counties;

To Mr. Peter Klein, Manager of the Berkshire Hotel, for the spacious ball-room tendered for the sessions of the State Board of Agriculture and the Normal Institute;

To Epler's Male Chorus in charge of T. B. Ammarell, assisted by W. B. Blatt, P. T. Hetrick, Martin Hetrick, A. D. Aulenbac, H. B. Ammarell, F. B. Ammarell, John S. Ammarell, Jacob A. Werner and E. W. Potteiger, for the splendid music furnished the Institute on Wednesday evening.

(Signed,)

T. J. FERGUSON,
W. FRANK BECK,
M. E. CONARD.

The CHAIRMAN: I want to say, after Mr Watts' paper, that I believe we have had no more important subject before us than that which he has presented to-night, and if there were time, I wish we might have discussed that question. But I know you will discuss it as you go about over the State, and I know the education of our rural children, know it personally, what it means to educate them in the country to-day and to have them sleep at home. It just means so much to the child and, more, perhaps, to the home, and this is a question that we to think more seriously about;

but we have not time to discuss it to-night. I know we are not going to, but let us not be passive on this question, but let us see that our community has the schools that our children ought to have. Now I have the pleasure of introducing to you one whom you are anxiously waiting to hear, I know, and she brings her own message as only Mrs. Morgan can bring. So I have the pleasure of introducing Mrs. Rose Morgan at this time, who will tell us of the "Songs That Live." (Applause).

THE SONGS THAT LIVE

By MRS. ROSE MORGAN, *New York City.*

Mrs. Chairman, Friends and Co-workers: It may seem a bit strange to you who think of me as dealing with songs, to hear me say, and I speak the truth as I say it, that everything that has been said here to-night sounds as friendly as friendly can be. I was educated as a musician and as a singer, yet the years went by and a bigger thing came into my life than any professional work. And to-day I am chief of all, a home-maker and a home-keeper, and in the home there is a Mr. Morgan and it is distinctly not a case of his being Mrs. Morgan's husband; I am Mr. Morgan's wife. (Applause and laughter). But I do feel that in addition to this home-making, there need not be a cessation of things that I care a great deal for, especially as those things emanate from a common experience of Mr. Morgan's and mine; for Mr. Morgan, you may not know and you may care to know, has that rather anomalous work of directing agriculture in the great University of Columbia, in New York City, and his chief business, as he has said many and many a time, is to prevent that idea of uplifting the country people, as a rather hideous and weak-minded attitude of the person who undertakes such work. On the other hand, he says that 80 per cent. of his time and energy goes in New York City to preventing the back-to-the-lander from making a fatal mistake, in that, in most of the cases he is not fit to become a country citizen, and he tells them so plainly. The other 20 per cent. he works with as best he may in his own courses there in Columbia University, in extension work, going out to the people in the city, sending them to nearby colleges of agriculture or to such places as they may be able to go and get steady, good, regulated work.

Now, in all of this, my sympathies are not only maintained towards the country, but I have made a special problem for the last eight years of discovering what kind of songs our country homes, churches and schools are living on; and if we had not had already time taken—but we would not be without one sentence of what has been said—speeches, three or four parts of ones, at least, I should lay a foundation and tell you, because you are interested, what it is that I know regarding our music, songs, particularly in the country home, school and church. But you have been thinking

those things too, and so, very briefly, I will say that much that could be safe-guarded, clean and good in the country home, which is its own castle, fortified by its own desire to stand high and clean, is not the cheap Broadway song that has crept out into the country, and I have definite data that the country home, as much as the city home, revels in the cheap rag-time song of to-day.

What is that song? It talks about the girls on Broadway and the music with the meals and the father and mother—the father's a Governor and the mother's mam; the two are necessary, but they are not to be minded over much, just more or less tolerated. And the young people, oh! they make love at midnight and must not take life too seriously, it all passes off, you know, and if it does not pass easily, the divorce court takes care of it and you can begin all over again. Eighty per cent. of our popular songs deal with love of the cheap, not holy variety, with a rag-time chorus, and everybody is singing it.

Now in the city—I must make this brief—there are literally hundreds of thousands of dollars spent for free music to offset that kind. But the country boy and girl, to my definite knowledge, gets hold of what is called the latest hit or the latest best seller and he keeps it as a treasure in his home, sometimes for three years, grinding it over and over and over, never realizing that that thing ran about three weeks in the city and then died out. Why? Because it did not have strength to live. It is a thing that never should have been born; it lived just a little while and died out and made room for the next cheap rag-time song. Now, if you can say to me, as brother to sister and friend to friend, and worker to worker, "Mrs. Morgan, we haven't in our community a single bit of that cheap rag-time music, we have only songs that live," then you don't need to listen to the scolding part, the preaching part of my talk. But I have not yet, and this year I have given six hundred talks or lectures, as they call them, in nineteen different states of our Union, at eighteen different State farmers' meetings and at a large number of Farmers' Institute meetings, and in not one has somebody stood up and said, "In our community, to my knowledge, there is not one of those cheap songs." I am not expecting that. I have had women and men say to me, "Mrs. Morgan, there is not such a song in my home," and I dare say some of you can say that now to offset that. I feel, as Mr. Seeds said, that I have had such personal experience as a child, a girl, a young woman and now a woman of middle age or getting toward that—I have had such personal experience in the songs that live that I am going to, without apology, tell you my own story, not because it is a new story—rather the opposite, because it is a story that you can parallel, many of you, in your own experience, and say, "Oh, I have a song too that I learned at home and I shall never forget it. My friends, I should not be here to-night if I did not feel in our country homes—I think of the town and to-night the country and most of the nights the country—in our country homes, the danger to-day is that the child will go out and become 21, become 35, become 40, become past middle age, become an old man or an old woman and will not be able to say, "I learned that song at home," for the cheap rag-time song will die in a year or two and the song that lives is not being taught to-day.

Why? We are living too fast. A professor at Cornell said that one of the greatest menaces of our country people to-day is the fear of not being up to date. That's all right. We want to be up to date in the city, but not with the city rottenness. When we sing, close the door on the song that talks of filth, and 80 per cent. of our popular songs talk it; the boys and girls know it but the old people, or the father and mother not old, not even middle-aged, some of them, think, "Oh, well, you know, they have to live in the present, they have to do what the people in the present do." That is all right for clothes, even though they are almost indecent, if you say so, that is all right for furniture, it is all right even for foolish walk and foolish dress and habits and all that, they are simply on the outside and can be laid off. Certain influences can wipe off the bad of them, but what is the song? It is the expression of the heart, and when a boy sings of an attitude toward love that he would not say in words to any young woman, but when it is put to a tune, he will sing it, he opens an avenue for cheap and evil logic; and my own brothers have said so—college men have told me, farmers have told me, every type of manly occupation as a community builder has told me that the song nowadays is not regarded as a great character-builder, as it used to be.

Some of us do care so much though that we speak of it and you respond and listen to my story, which is very personal, because, as I said before, it is your own experience. My home is in Wisconsin, and there I was born and there six children of us were born, to a very humble, as the world saw them, father and mother. And yet my word for it, I never knew so great a father nor so great a mother, because it was my father and it was my mother, and I remember the things they did during all my life from babyhood up, to prove what a good father and a good mother can do and will do for the child while it is their child. One of the great things, as heritage for me and for my five brothers and sisters, is this mother and father taught us old songs, songs that live, and to-day the six children of us—though one we say is dead, but she still lives—the six children of us sing those songs. Why? Because they are historically great? Not at all. They are historically great; the world says they are great songs; why do we sing them? Because mother and father taught them to us and we live over again the child days and the songs we learned from father and mother in our childhood are great enough and good enough to sing now that we are middle-aged and we are going to refer to them. When I go home at Christmas, as I always try to do, about the first thing I do after greeting those in the home, is to go into our little sitting-room and open up a little wood cabinet about 3 or 4 feet tall, and that is our family treasure. My father was a pioneer from Virginia through Ohio and into Wisconsin. Mother was a pioneer from New York City west. They were both small when they pioneered, and they and their father and mother before them took no treasure. Pioneers do not take treasure, they take the littlest they can get on with and no more, so that cabinet of our does not contain heirlooms such as you Pennsylvania Germans, does not contain the silver and the carnets and the pictures and the rare old books; nothing of the sort. What does it contain? Family treasure; it contains the old song books that we six children had from our babyhood up, that's all. Yet the six of

us, going from home as all of us have, could take anything, it is loose and no one would find any fault, but not one of those song books, by common consent the old home song books stay there, because it seems like the history of our home. Upon the chest will first be mother's song books, next father's song books, Will's song book—Will is now a professor—then Rose's (myself) song book, then Mary's and Charlotte's and Susan's; the whole family all had song books; some were funny, some were serious, but there wasn't a single, filthy, rag-time song in the whole box.

Now friends, my confession; it is not because I was such a model girl, such a fine spirited young woman, that there are not rag-time songs in that box, but it was because I had a father and a mother, and the story is, this father and mother, when I was about 3 years old, did what fathers and mothers will do, looked at me and studied me—I was the oldest girl—and said, "What is she going to be?" At three years they thought they discovered that I wanted to be a musician because I heard a woman playing a piano and went home and taking my mother's song book to the window sill, my mother found me playing and singing with all my might, and mother called father and said, "She is going to be a musician;" and my mother said to my father, "Will you stand by her and help her get an education in music?" When I was sixteen, the same father and mother had another little conversation in our western town. "She has gotten all the music she can get," and decided to send me to Boston, which some people don't call a place but just a state of mind, and to Boston I went to get a musical education, and when I came back I had a very great change—musically, just a little bit; I had a Boston air settled all over me, which I had cultivated with very much effort, and everybody was made to feel, "Now I am just a little wiser than my father and a great deal more up to date than my mother, so look at me and I will stand for the family."

But my father wouldn't have it so. He was a hard-working man, being a contractor, he worked hard all day and was in his office all the evening, so as to get double wages for the family, and mother never was through, day or night, and so when the high school boys came to call on me, the first week, I didn't realize that father and mother had grown grayer because I had been sent to school, I felt it was too bad, "but I'll step forward and show them what the world is like, and father and mother can stay in the background." They ventured to ask me to sing, after I had shown them my Boston air. "Oh, yes, I'll sing, and I stepped to my little home instrument, spread out my music, and began to sing. The song I sang told about a young lady and a young man who were in love with each other—that is one of the greatest human experience, and when a home is the result, it is, I think, the greatest, and this story said they went to a dance—now a dance may be all right, but it has got to be a sensible and guarded thing, and at the dance the young woman discovered there was another young man on earth besides the man to whom she was engaged, and then came the chorus, "After the ball is over." How many of you remember ever having heard that song "After the Ball is Over?" Well, I am glad of it, you and I are more nearly of an age. How many never heard it? Hands up. I see. Well, very few of those who are old enough and those of you

who haven't heard it very likely are those who simply were not living at that time where it was sung and I can hardly think where that was, but I congratulate you if you don't know the song. I sang this song and then something happened, and this story is the kernel of my experience in song provision for our home.

I heard my father's step inside of the house. Now you know sometimes your father can walk one way and sometimes another, and this time my father stepped that other way, and he had been smoking on the outside, on the porch, listening to his daughter sing, the one for whom he had worked hard to send her to Boston, but my father was not afraid to be the father. The room was full of high school boys and girls. In came my father; "Daughter, what was that song you sang?" "Oh, father, that was the very latest, everybody sings it. Don't you think it is perfectly charming?" My father simply took the music and put on glasses for the first time. Fathers who work days and nights are likely to take to wearing glasses soon. He read the words all over as though he distrusted his ears, and then he turned to me with a little look and without a further word, he stripped that music this way and this way and this way and crosswise and put the pieces in the little fireplace back of us. My Boston air and I walked out of the room. My father walked out too. He didn't say one thing, however, until Sunday.

On Sunday, you don't care for all he said, but he said three things I never shall forget and I must pass on to you now. One thing was this: "Daughter, if that kind of song is the only kind that you are going to sing in the old home, you need not sing any more." "Daughter, if that is the kind of song you have been buying while you have been away, you need not buy any more songs without your father's direction." "Third, if that is the kind of song you are learning back in Boston, you need not go back another year." Oh, I almost hated him. I simply felt "poor, old fogey, way behind the times, hopelessly out of date;" but I didn't say so. That night my father, who was truly a religious man, didn't want the sun to go down on his wrath, and this is what he said: "Daughter, until you can use better judgment, father must stand in judgment for you." That was all, and I never can forget it. I was not converted by it at all, against singing the songs that said, "Don't take life too seriously, make love easily, the divorce court is such an accommodating institution and you will be taken care of and you can try again," the substance of that "after the ball is over." When I was about twenty, nearly that, I was helped to go to Italy to study, and there I had my first great lesson that the children who learn good songs may come, as they do, from Italy over here to get rich, they will take American slang, American clothes, American everything; but when they come to sing a song, they will sing a song of their own childhood. And on the ship going to Italy, there were 1800 in the steerage, those 1800 thought they saw Italy and called out "Italia," "Italia." It was only the Azores and they began to sing, meanwhile getting on their clothes, talking the American language, and sang what? The songs they had been earning their money with on the hurdy-gurdy organ? Not at all, the most popular song of Italy, but Italy does not provide rag-time songs for its country or city boys and girls.

Italy is naturally a musical country, and we can learn that much from our hyphenated-Italian-Americans. Call them in and say, "Sing us a good song from Italy and help us to build up our kind," and I want to tell you we have about forty villages and country places in this United States where the Italians are now citizens, depended upon as such, because they have been asked to contribute what? Money? No. Skill? No. They are still called "dagos," still called "guineas." But they have been asked to come into the community songs and contribute and they contributed so many songs of the type that people like that we have accepted them as song-makers, song-builders, and the most popular song of Italy is this little home song that I am going to sing to you.

Why do I sing it? Because you will hear it and hear of it always from now on. It is an adopted American high school song brought to us from Italy as a contribution, the most popular song of Italy. The first stanza says, "Saints of light, welcome us home, we are homesick." Is there anybody here who does not know what homesickness is? If there is, perhaps you won't realize why this 200 years old song of Italy should have lived and now become one of the Italian-American songs, a gift from Italy to America. (Mrs. Morgan then sang the song in Italian).

Then they dance, not the fox trot or bunny hug, but a simple old folke dance, perfectly clean. If you were homesick, coming to your home town after you had been gone a number of years, whatever your town is. I'd say, "Oh sweet, Oh dear old Boscobel," the name of my home village, and the Italians would say, "Oh, sweet old Naples;" but they do not feel that way so much when they have been asked to contribute the thing they love the best to this country, and that is the song. I sang it in Italian for this reason—I am glad you like it—we are Italians when it comes to singing the Italian songs. Why? We are not singing an Italian song born in some low-down street in Naples and which will die to-morrow, for the dirty thing cannot live, we are singing a homesick, homesick loving song of the Italian people to Italy, born 200 years ago, and it will never die and it is a contribution now to us Americans to help us to build the kind of song we ought to write in America instead of rag-time songs.

But I must hasten on. We are not Italians, at least most of us are not, and we will come back and go across the North water, for most of us have north blood. How many have? How many have Irish? We are proud of it: raise your hands way up: good. I am glad to see it. How many of you have Welsh blood in you? Hands up. They say "Mrs. Morgan, you ought to have Welsh blood." They forget that Morgan is just a borrowed name. How many have English blood and know it? How many have German and know it? That's right, hands up: we are proud of it. You have in your little chest in your home or in your memory a number of songs very dear to you. Are you using them to make them live? We will connect some of the songs all of us know with the boat again: we have to be on the boat—I wish we didn't—to go across the water: and I, as usual, am down below; I don't want to talk to folks, I don't want

to eat or smell things. I don't want anybody around me at all; but I do try to get up the last night, that is the night of the Captain's dinner, everybody sings his home songs on that night; so I came up that night, very stiffly, but I stayed up.

Now the boat was the Kaiser Wilhelm der Grosse, and therefore the Germans were asked to sing the first song, and they sang—I am not German, I often wish I had German blood in me, but I know absolutely one reason why the Germans are as they are to-day, pitiful though it is to them and everybody, yet I know they are one man when a regiment begins to sing, and that regiment knows its songs. Why? They learn them in childhood, it is a part of their preparation to become German citizens that they should know the German songs; so, when the Germans sang that night, what did they sing? Of course you all know, "The Watch on the Rhine." Did the old people say, "I am too old to sing?" Did the young man say, "I don't know that song?" Did the middle-aged say, "I have gotten over my singing days, I guess I won't sing?" No, everybody, every German on that boat, either sang or repeated the words, and there were something like six hundred Germans. "Watch on the Rhine"—it was glorious. Next came the French; they didn't sing so well, but they sang well the Marseillaise. Next came the Danes, with their country's song. Then came England with—my, what did they sing? Do you know? How does it start? How many know the words, being English, of "God Save the King?" Hands up. Your English blood is more American, isn't it? That's good. Therefore you know the next song we tried to sing on the boat,

The English sang theirs gloriously, and then we Americans, the biggest party on board, nearly a thousand, were asked to sing. What did we know. We all stood up with a good deal of bravery. I did some singing; they asked me to step out in front and lead. I like to look nice—that's the woman of it—and so I asked for the American flag and it was brought for me and they put about us a great, enormous American flag. We started to sing our national hymn, "My Country, 'Tis of Thee." We sang one stanza, sang it well; then we started the second, some started the third, some the fourth; then we started over again and some, not knowing, went back and sang the first over again; some started the second, some the third, and we started again and we didn't agree and we couldn't sing it together and we quit.

I talked with an Englishman on the deck afterwards; he was a polite Englishman and tried to find out—he knew I was chagrined—how I was feeling about our giving up our National Hymn and quitting before we were through, and he said something like this: "You don't seem to take your American hymn very seriously, that is you don't seem to agree upon it;" and other little things like that. I tried to apologize; I said first one thing and then another. I said, "You know, in England, I lived there a couple of years and I have gotten used to your opening your theatres with "God Save The King" and closing all your meetings of governmental interest, etc., but you know we don't do that way," and then I said the worst thing I could have said, "You know we are a very new country." And then what did he say? "Ay, yes, very new indeed."

And then I said, "I will never again apologize to an Englishman for not knowing America, never so long as I live;" and I took a vow that before I went back on the return boat, I would commit to memory the four stanzas of "My Country, 'Tis of Thee," and I would know every word in its place.

Now it is not fair for me to say to you—we are very informal to-night—for me to say to you, "How many here are absolutely certain that they can repeat it or sing it?" And it is very much the same, you know the Bible does not say one word about the voice, it says things with the spirit and with the understanding, it does not say a word about the voice, and if you have the words and the spirit, there is no reason in the world why you should not sing, name over the words or feel them over or think them over or hum them over, but always take part. I won't say how many here can? I will say this; two weeks ago I was in Washington at a Chamber of Commerce meeting, business men's meeting. You would think they were so busy that they never had time to sing or think of it, but when we came to America, it was one of the rare times. One of the men rose and said, "Mrs. Morgan, can't we sing it together?" Ordinarily when I say, "Let's sing America," people say, "The old thing, that's not an interesting song, that kind of drags and there is no snap to it," and that is the way they look; but that man said, "May we sing America together?" Why did he say that? You know perfectly well. It is in the air now as never before, "America, My Country 'Tis of Thee." We are going to sing together, one stanza. I won't say "Will you sing?" I am going to say, "We are going to sing," because we are citizens of this country and I won't insult you by saying when the first chorus sounds, don't ever wait for the minister or your leader to get on your feet. We never sing America sitting. Sometimes we have done it because we are a new country and have to learn about it, but we will not do it from now on, whenever we sing America, everybody gets to his feet. Let's sing the first stanza of America. (This was done).

Thank you, I will have that to remember from the State of Pennsylvania, and I want to say to you that with one exception, that where they were all men, I have not had better responses. All men did once all sing; they were army officers and they all knew America and we almost know it. You know where to make good. On the same boat was a Catholic priest; I am not a Catholic, but it makes no difference, there are hundreds of songs that live; the priest said to me, "I hear that you are going across to get the songs of Ireland." I said, "Not altogether, but partly." He said, "Come to my part of the island, 'tis the loveliest part of all the island." Now he was a Catholic priest, who, for twenty years, had been doing good work in the slums of New York; he was going home to be with his old sister; she was expecting him and he said, "Come and see us; Ah, my sister will give you the greatest welcome. Come and see us." "I will," said I. You know we don't stand on formality when our hearts are touched; you can be as genuine as can be, and about four weeks later, my jaunting car driver and I drove up to the old lady's home and she came trotting out to see me. Perfect strangers? Not at all; her brother had told her of me; she was expecting me. She said "Have you heard it?" I almost made a mis-

take and said "Heard what?" But I did not. I remembered then and said, "Yes, I have heard it." "Ah," she said, "'tis the loveliest song in all the island." What was the song? Where had I gotten it? (Mrs. Morgan sings Killarney).

I would sing it all the way through, but you know I must go rapidly. On the same trip, after I had left that dear old lady and the priest, a fine man too was he, I had one more experience, and I want to relate that to you. It was this; The bridge-tender in Dublin—I wonder if he is living now—asked if I wanted to hear the Tom Moore bells in Dublin, and I said, "Yes;" he said, "You know who Tom Moore is?" I said yes to him; inside my own head I said "Tom Moore?" Yes, I knew Tom Moore was a poet. I turned it over. Tom Moore—what did he write? And the old man began to sing. Now you know the Irish can do three things at once; the jaunting car driver could drive his horse and sing a song and smoke his pipe all at once, and this man did much the same thing, only his pipe was bottom side up. He was a little short man, and the Dublin bells, the Tom Moore bells were ringing. Where Tom Moore wrote his song, the old man stood and sang, "Those Evening Bells, those evening bells hold me until their music tells of youth and home and that sweet time when last I heard their soothing chimes. Those evening bells, those evening bells, Oh, ne'er a tale their music tells." Before he finished it, I was singing with him, and when he finished I said, "I know that song, my mother taught it to me when I was a wee little girl." And he said "You must have had a good mother." And we made no more comment about it. (Applause).

I could stay in Ireland, Oh, I could stay there with you if you would stay with me, all the rest of the night. I loved Ireland; I haven't the Irish in me, but I know they were that warm-hearted and kind and full of care-taking and I got a lot of songs. I did get one thing also that I didn't really need. The Irish with whom I lived lived largely on buttermilk and potatoes and I gained 31 pounds, which I hadn't any need of at all. However, I forgave them that when I recounted my songs and realized what a wealth of Irish songs I had first hand, and all the Irish people knew, and how did they happen to all know them? Why, it is an unwritten law; they learn them in childhood. But do our Irish children learn them over here, or, because we are mixing bloods, are they losing the old Irish songs? Can you, as Irish, contribute as the Italians do?

Scotland—if you have Scotch blood in your, you are glad to get to Scotland, as I was. My mother's ancestors were named Kirkpatrick and my father's, Buchanan, so on both sides I am Scotch, and I went first to the home of Bobby Burns, for he is the Tom Moore of Scotland, and I went to Dumfries, where, as we say, he was buried, and there I learned the history of Scotland's greatest song, I think. What was the history of it? It is a little story that runs like this: I was traveling all alone; I promised my mother I would go to the same line of hotels so as not to miss the mails, so I was traveling the line of the Kings Arms Hotel, and so all I had to do was to sit in the buss marked that way and watch the people, and if you watch the people long enough, you will generally see something interesting. Two people came toward me, a tall lady

and a wee little man. By certain signs which I thought were correct signs, I said to myself that they were husband and wife; she was bossing him and telling him to do this and do that and he was minding her; and I said, "He is not an American," but I couldn't think what he was. They talked a tongue that I couldn't locate.

Finally—he was, he was on the step and she was inside, and they started to the hotel and I didn't expect to ever see them again. Finally I was in my room and the man came up and said, "Won't you come down and have a cup of tea with us. I went down and there sat the tall lady and the little man; and finally he said, "Will you have a walk with us?" We started off to walk, the tall lady and I, and the little man followed and we walked and walked and walked, and finally we stopped—I learned afterwards it was six miles—when the tall lady stopped and I stopped and the little man stopped, and the tall lady turned to the little man and said, "Sing;" and of course he began to sing, and I wonder if you know what the song was that he sang? She said to me "Do you ken where you are?" (Do you know where you are?) I said "No." She said "Have you ever heard of Maxwellton?" I said, "Yes." She said "Yon, is Maxwellton;" and she pointed to a little church and said, "About 28 years ago he and I were married in yon church and we went to Australia and we have not been back, but just now to put our two sons in Edinburgh University, and we could not return to Australia until we came once more to Maxwellton. It is the loveliest spot in all the world. The Irish would say that Killarney was the loveliest and they have a song to prove it, but she said Maxwellton was and she had a song to prove that, and the little man sang a song of Maxwellton, and when he had sung a stanza, she joined in and then they sang the third stanza, and when they had finished the third stanza and the last strains of the song had died away, I looked at them and the two were crying and holding each other's hands. Finally she turned to me and said, "What do you think of that song in your own country?" I said, "We like it." "You ken you don't."

I thought that was a strange statement, but for once my wits worked and I said, "We think so much of that song in our own country that one of our best poets has said: "They sang of love but not of war; forgot was Britain's glory; we may call it a different name, but they all sang Annie Laurie." "Very well, very well," she said; and then she asked me if I would please go up to Edinburgh and to a certain place in the University and find the proof that the poets had decided that, for three things Annie Laurie should be the type of the world's best love song, which I did; I went up there and they said when they met in Germany, the poets then living from all the countries, that for three things which are essential, Annie Laurie shall be the type of the world's best love song; First, chastity—that means cleanliness; second, simplicity—that means a song that anybody can sing; third, the proper welding of words and music, Annie Laurie shall be the type of the world's best love song.

My friends, how does that compare with last year's best seller, called "Oh, You Big Beautiful Doll?" How many heard of that song—"Oh You Big Beautiful Doll?" Well, I am glad your hands come up just a little. The song is dead now; it should never have

been born; it is dead as it can be. But while it was being sung, what were our young people learning to build up character on for all the years to come? You know Annie Laurie,—we must not stop.

In the same country I learned another lesson; I must give it to you. How many know what the kilties are? Not the kind the ladies wore last year or the ones they are wearing this year, but the instruments they carry to make music, the piebroch and bagpipe and all those instruments. I was invited to the Kiltie Band's concert. I said, "I will come gladly." What did they do? They, in their good nature, provided with much care an American program. I thought they were going to sing Scotch airs. What was the first song they sang for me? They say your sins will find you out, and that first song they sang for me was the identical song which, many, many years ago, my father had taken and torn up and put in the fireplace; they sang "After the Ball is Over," as an American song. I said, "No, no, that is not an American song." They said, "Oh, yes, an American wrote it." I didn't say that he got \$85,000 for the copyright, but I simply said, "Nobody sings it now;" and they all laughed at me. But they were Scotch and I might as well have saved my breath. They said, "You ken it is an American song." The second song was like the first, "A Hot Time in the Old Town Tonight." And when I said, "Yes, yes, that is an American song, but we don't sing it any more," they laughed and said, "You ken it is an American song and we paid a pound to an American to teach it to us;" and then they played the last song and I applauded from start to finish, and when it was over they said, "You ken we learned that song in Germany." And I said, "I can't help it, that is the best of all our American songs." I think the Germans had taught it to the Kilties as the best American song when they went over there on a two weeks' holiday.

What was that song? I shall refer to it in just a moment. I said, "I am going across the water to get good songs, I am going home, it is time to learn my own country's songs," and I had had five weeks' vacation and I started for home, going by London where the greatest home song that ever was written was finished, and by an American. What was that song?

"Mid pleasures and palaces, where e'er I roam,
Be it ever so humble, there's no place like home."

A charm from the skies seems to hallow us there, which, seek through the world, is ne'er met with elsewhere. (Quotes balance of the song). And that was written by John Howard Payne when he was no longer an American citizen, and that same John Howard Payne, to whom we once said, "You cannot be an American citizen, you have been a traitor," we finally adopted because he wrote a great American song and sent a battleship to Africa to bring back the remains, to our national Capital, where they now lie. Why? Because he wrote the greatest American home song.

I went to London for one other reason, to get the exact words of "My Country 'Tis of Thee," and commit them to memory before I went on that boat again, which I did. Once in the Harbor of New York, I wrote a letter to whom? I wrote to the President

of the United States. I think that was quite a brave deed of mine, or a foolish one, or both. I wrote to the President and said "Mr. President, did you say"—(or something like this)—"that the best of our songs probably come from the old slave hymns of the South?" The President wrote back, "I did," and signed his name. Now wasn't that rather a brief letter? But that President had been nagged almost to death because he had entertained that great negro teacher in the White House, and hundreds of fine ladies had written to Mr. Roosevelt, "How dare you entertain a negro in the White House?" And Mr. Roosevelt, who was the man who signed that letter, probably thought, "Here is another woman trying to find fault with me, and so he said "I did;" but being a woman, I wanted another word and had it. I wrote to him and said, "Will you please tell me how to go about it to get those songs?" And he wrote back a letter at length and told me what to do. Mainly he said, connect with Booker T. Washington; whose name I speak with the utmost reverence. Dr. Washington whose earthly career vanished from our understanding, we will say, last fall, wrote me this letter, very brief: "If you are sincere, I will help you to get the genuine old slave hymns," and signed his name. I wrote back, "I am sincere;" and he helped me all the winter.

I must take but the briefest time, but I must tell you one bit of what I got. He told me to go to Fiske University. How many heard of Fiske University, where the colored people have a high class educational institution? He told me to go there, and let them, the Fiske Jubilee singers—how many heard of them—let those singers take me around; and they finally took me to a camp meeting, a negro camp meeting. How many have ever been to a negro camp meeting? Good. In Wheeling, West Virginia, not long ago, I said, "How many have ever been to a negro camp meeting?" And they said "Huh," as though everybody had been. Just a little while ago I was up in Montreal and said, "How many have ever been to a negro camp meeting?" And not one person put up his hand; they looked blank as if they had never heard of such a thing. But I learned, in a negro camp meeting, how their old songs were built. I was taken to the door by Mr. and Mrs. Work, two people out of Fiske University, left there and told that I would be called for in time. I was passed to the first negro usher; that usher passed me to the next, that usher to the next, and finally I was lead up to the "mourners' bench," the only person on the mourners' bench, and I was left there. The meeting began. Four ministers stood; they all took texts, all announced them and all began to preach at once, and it was truly a case of "the survival of the fittest." At the end of about two hours, three ministers dropped down, continuing, however with this sort of thing, "Hallelujah, bress de Lord," and kept it up so loudly that the last minister could scarcely be heard; but I could hear him and he did what they always do, he turned. When he no longer could talk, his text was turned into a song, and the text was, "Wash Me and I Shall be Whiter Than Snow," the favorite text of the negro, and he turned his text "Wash Me and I Shall Be Whiter Than Snow,"—I was not surprised at that, for his noise had been half singing for the last hour, but I was surprised when that great audience all began to hum the text, humming it all over the

church, and harmonizing it beautifully. I did not know whether to laugh or cry, I think I didn't do either, and finally they began to weep and to sway. I afterwards heard they were getting the power, and finally one little lady jumped up, I could see the little bonnet tied neatly on her chin, and she ran up the aisle and made straight for me where I sat on the mourners' bench. When I saw she was coming, I rose and she put her hands up on my shoulders and she said, "Honey, am you a Christian?" Now that is a hard question to put to anyone. We can say we hope we are, but she wanted me to tell and I ventured and said, "Yes, yes, I am." "Praise de Lord, de white girl am a Christian." "Oo hoom," from all the audience. Again she sang it, "Praise de Lord, de white girl am a Christian," and again they all harmonized a little chorus. You notice she took the tune the minister had taken, "Wash Me and I Shall be Whiter Than Snow," "Praise de Lord, de white girl am a Christian."

At 11 o'clock Mr. and Mrs. Work came for me and Mr. Work said, "Have you learned anything?" I said, "I think so." He said, "Now if you could go every Sunday night, the last minister would add his text and keep the original tune; the result would be the winter's folk song, sometimes 50 or 60 stanzas." He said, "Now you thought the song was so strange, because the stanzas are all separated." I said, "it was, but now I understand." The first stanza was the first minister's text:

"Little David was a shepherd;
But he killed Goliath."

The next stanza was the third minister's text:

"Joshua was the son of Nun,
And never quit till his work was done."

The next stanza was the third minister's text:

"I done told you once,
I done told you twice,
There's a sinner in hell
For shooting dice."

That makes a standard old negro song. If you want to hear it beautifully sung by the Fiske Jubilee Quartette, get it as a Victor record called, "Little David," the prettiest, I think, of all the old negro folk songs. Also you can get "Swing low, sweet chariot," "Come for me, carry me home," "Oh, look at the Lord," (singing the song).

What is that? "Rag time." They say "Mrs. Morgan, is all rag-time bad?" And I say "No rag-time is bad. It is tiresome to hear only rag-time, rag-time all the while, but it is the filthy words talked to the rag-time that makes them intolerable. And let me whisper this, "The negroes give us the beautiful rag-time quality, the words of the forbidding songs are, in the main, written by white people.

But there was a white man who understood the negro, he understood why he liked rag-time, but he never thought of writing dirty words. He came from your own State of Pennsylvania and proud

you should be of him. He is our best American old-song writer, Stephen C. Foster, who was born in Pittsburgh, and Stephen C. Foster wrote that third song, of which I told you, that the Kiltie Band played. He wrote a lot of songs. He wrote "My Old Kentucky Home" and "Old Dog Tray," which Abraham Lincoln loved so much, and "Nellie Was a Lady," and "Ole Black Joe." Then I think the best of all his songs was that song which he wrote and told of the "Old Folks at Home," and said in the chorus:

"All the world is sad and dreary,
Everywhere I roam;
Oh, darkies, how my heart grows weary,
Far from the old folks at home."

Another homesick song, very much as you see, like the homesick song of the Italians. Is there anybody here—what a foolish question—who does not know "Way Down on the Suwannee River?" Who cannot join in on a stanza? I would sing it all, but for lack of time, but we may never meet again; you have some memories that I cannot possibly have; some of you have children, which I have not, and then you have that great experience of which I am bereft, and some of you are singers of long time past and have laid it by for some years, saying, "Oh, I don't sing any more, I have gotten out of the habit of it." If that is true, come back to-night on this best of our American folk songs, "Way Down Upon the Suwannee River." It is like "Annie Laurie." Old people sing it but think of a different name than Annie Laurie, perhaps.

Now I don't think of the Suwannee River when I say "Way down upon the Suwannee River; I was born on the old Wisconsin River and I think "Way Out Upon the Old Wisconsin," and you think of some other river, may be, but we will all sing "Way Down Upon the Suwannee River;" all sing, everybody. (Mrs. Morgan sang, the audience joining).

If there is one place above another where that song is supremely fit, it is the farm home and I didn't wonder when we heard our friend say to-night that he wouldn't sell the farm, that the children wouldn't permit it. Mr. Morgan has said to me "I am so sorry my father and mother looked with yearning toward the city; we children want the farm," and I think of you people as having a tremendous influence with songs like that, because you have something permanent in your home, around which all those songs may be built for the children for all the years ahead.

At Farmers' Week a year ago, a young man came to me and said "Mrs. Morgan, I don't think you like love songs." I said, "Oh, nonsense, if I didn't like love songs I wouldn't be Mrs. Morgan," but he thought I didn't like them because I had been finding fault with the cheap ones. When he asked me, "What sort of songs shall I send to my young lady, you have converted her?" I said, "She wants good, clean love songs;" and I gave him a list of good clean love songs, including "The Rosary," one of the old time love songs. Last August I was in his home at Chautauqua. I was speaking at Chautauqua Lake and we had a tremendous audience, 6,000, and we all sang and sang, and at the close a young man came up and said,

"Won't you come out and see me; see my little house? I have got a fine little home out here." And it was not the house he wanted me to see at all, for in that little wee cradle lay a little wee boy, and he said, "Mrs. Morgan, that kid is not going to be raised on rag-time." I didn't say a word.

It was at the same Farmers' Week, as old Uncle Ezra, as everybody in New York State learned to call him, came up to me tottering, 86 years old, and said, "Mrs. Morgan, I love the songs you have been singing and asking us to sing. I made a special effort to get to Farmers' Week this year. Mrs. Morgan, I don't believe I will ever be able to make it again. I want to say something, Mrs. Morgan, you are not singing enough of the songs of the homeland; I want you to sing more of the songs of the homeland." It took me a full minute to know what he meant by the songs of the homeland, and then I understood. The young man who was about to build an earthly home, wanted fitting songs to raise the little boy on; the old man had lived his earthly life and wanted songs describing his home in the world to come, and he said "Will you sing one if you know any?" I said "I will." We went in and closed the door and he began to sing and I sat and listened, and he sang a song which I think a great deal of, because it is the first hymn that I remember my mother and father singing, and I sang it with him, and Mr. Van Renslaer said that the prettiest sight of all Farmers' Week was the grown people going back and forth to lectures, stopping at that door and listening to the old man singing and joining in the chorus.

Last Easter Day I started to see old Uncle Ezra because I was near Syracuse, where he lived, and his daughter-in-law came to the door and said, "Mrs. Morgan, he has passed on; I didn't know your address, or I should have sent you word. He passed on but left you this message," and she handed me the message. He had said, "Mrs. Morgan, don't forget, wherever you go, to tell all the people to sing the songs of the homeland in their homes and their churches and their schools;" and everytime since I have said to the people, "Let us sing old Uncle Ezra's song, the song that you know and I know." We will sing one stanza, not in memory of him, but because we all know something of what it means. It begins "There is a land that is fairer than day," and the chorus is "In the sweet bye and bye." Sing it if you know it; some of you don't, but most of us do. (The stanza was sung).

Just one more, and that is the hymn best known of all the hymns in all the world. The hymns are love songs too, as you well know. Not long ago Mr. Morgan and I took a trip to the Holyland, to Palestine, and there they took great delight, apparently, in pointing out to us just where this incident of the Old Testament happened, and just where that happened, of the Old Testament especially. You know the fact is, they cannot possibly know just the spot, but it makes so little difference. When we came to Bethlehem, they said "This is surely the place where Jacob had his dream;" and I said to myself "May be it is, it doesn't make much difference to me." I looked at the little chapel marking the spot. But I remembered two things, one that Sarah Flower Adams, when her sister

died, as we say, said "There is no God, there is no God, else I should not be allowed to suffer, the last of my family gone and I alone." She withdrew from what is called the Church of England and two years later she said, "There must be a great controlling love," and in her dairy, she put a stanza:

"Nearer my God to Thee,
Nearer to Thee,
E'en though it be a cross
That raiseth me.
Still all my song shall be,
Nearer my God to Thee."

She writes about two years later, she was reading the story of "Jacob and His Dream," how angels pointed the way, which way to go, when he was in a dilemma, and laying himself down to sleep, thought he saw these angels connecting heaven and earth, and she said "I don't doubt Jacob's dream, but I do know there are angels in my life showing me which way to go," and she wrote some more stanzas paralleling Jacob's Dream:

"Though like the wanderer,
The sun gone down;
Darkness be over me,
My rest a stone.
Yet in my dreams I'd be,
Nearer my God to Thee
Nearer to Thee."

For Jacob, you know, erected a little tomb and called it Bethel-House of God:

"Then with my waking thoughts
Bright with Thy praise;
Out of my stony grief,
Bethel I'll raise;
So by my woes to be,
Nearer my God to Thee,
Nearer to Thee."

She little dreamed that she was writing a hymn; least of all did she dream that she was writing the hymn that is the best known hymn in all the world to-day. I have heard it in thirty languages, and if you call the languages of the East Indian ten languages, I have heard it in forty, and it is sung in as many more languages and dialects. It is the Universal Prayer. Everybody, sooner or later, feels in his heart, "Nearer My God to Thee." Whatever we may say about it, we all have a prayer and that is pretty nearly the language. That is why we sing it, I think. Let's sing one stanza of the world's best known hymn, "Nearer My God to Thee." (The stanza was sung).

Just another word or two, and then I have finished for to-night. That song I told you was Sarah Flower Adams', but I didn't say so in my own heart. I remembered that she wrote it. What did I think? I remembered when I was fourteen my mother whom they

say is not living, but who is living so powerfully as all good mothers must always live, in her children, my mother said to me, when I was fourteen, "Daughter, take a hymn and grow up with it." I didn't know what she meant, but mother kept at it and helped me choose one, and she helped me choose "Nearer My God to Thee." At fifteen I didn't understand, but I committed it to memory. At twenty I didn't understand; only at thirty did I understand only a little, but now that I am forty or so very near it, I can understand as I certainly could not before my mother went to her great rest only three years ago, after sitting for twenty-five years in an invalid's chair, not moving, all sunshine, all sweetness, and singing "Nearer My God to Thee."

What did I think of when I saw Bethel in Palestine? I thought of what mother said, "Take a hymn and grow up with it," and that was my hymn. Oh, I want to urge upon you the bravery to say, when you hear the song that does not live, "Why sing it, it can't do you any good?" And then the strength to say "There is a song I'd be glad if you knew," and suggest that song and use your influence in the church and the school and the community, and most of all in your own home, to wipe out the foolish, meaningless passing songs, substituting the songs that live so that we, as American people shall grow up a singing people, binding together as I think little else can bind, the human heart.

Thank you for staying so long; thank you for responding, and if ever I can help you to find your particular song in your particular mind, as I have rather a good chance to do in New York and am doing every week, drop me just a postal, if you will, to Columbia University, and say, "I would like to get hold of such and such a song, will you find it for me?" It will be my deep happiness to respond and send it back to you. I am your co-worker in a sense way beyond anything I can tell you to-night. Thank you very much. (Applause).

The CHAIRMAN: I am sure you have all agreed with what I said, that the last would be the best. And now we come to the closing moments of our Institute and I think it only right that our Director of Institutes, Mr. Carothers, should close the evening.

MR. CAROTHERS: Friends, this closes the three days' session of our Normal Institute. While perhaps the time dragged along slowly with some of you, to me, this being the first Institute I have conducted under my recent appointment, the time has slipped swiftly by. We have enjoyed the lectures we have heard here. I am sure, as much so as the one you have just heard from our present entertainer, Mrs. Morgan. We will now have this Normal Institute closed by a benediction pronounced by Dr. Ferguson.

DR. FERGUSON: May the love of God and the grace of our Lord, Jesus Christ and the fellowship of the Holy Spirit abide with us all forevermore, Amen.

C. E. CAROTHERS,
Director.



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